The Afghanistan Engineering Support Program assembled this deliverable. It is an approved, official USAID document. Budget information contained herein is for illustrative purposes. All policy, personal, financial, and procurement sensitive information has been removed. Additional information on the report can be obtained from Firouz Rooyani, Tetra Tech Sr. VP International Operations, (703) 387-2151.

TETRA TECH

June 29, 2011

[redacted] COTR
USAID – Office of Infrastructure, Engineering and Energy (OIEE-AESP)
Café Compound
U.S. Embassy
Great Masood Road, Kabul, Afghanistan

RE: WOLT0034 Topchi Hydro Power Plant Design Review Recommendation Letter

[redacted]

Tetra Tech (TT) has completed their review of the Afghan Clean Energy Program (ACEP) 65 percent design package, which included design drawings, calculations, and technical specifications for the Topchi Hydro Power Plant project. TT's original scope was to review the 100 percent design package, but ACEPs plan to develop the Topchi project as a design-build limited their up-front design package to 65 percent, which TT reviewed accordingly.

A master list of the design review items and a master drawing list are included with this letter as Attachment 1. A detailed list of TT comments and ACEP comment responses is included with this letter as Attachment 2.

At this time, TT recommends that USAID not continue to tender this project pending the investigation of other potential dam sites in the Bamiyan region for comparison to the Topchi site. Major items that should be considered when comparing other potential dam sites with Topchi are the local hydrology, potential power generation, and site constraints (environmental impact, geologic hazards, etc).

Please let me know if TT can be of further service to USAID in future development of the Topchi Hydro Power Plant project.

Respectfully,

[redacted]
Chief of Party (OIEE-AESP)
Tetra Tech, Inc.

Cc: [redacted] (COTR-USAID)
[redacted] (POC-USAID)

Attachment 1

Design Review Master List

Design Drawing Master List

Design Review
TOPCHI HYDROPOWER PLANT
Review Documents File Exchange
WO-LT-0034

Component	ACEP File	ACEP File Received	Tetra Tech Comment File	TT Comments Sent	ACEP Responses Received	TT Back Check Sent	ACEP Respones Received	ACEP Final File Received	TT Approval Sent	Status	% Complete (*)
Construction Drawings											
Powerhouse and Two Family	Volume I - Construction Drawings	2/10/2011	Architectural Drawing Comments	3/8/2011	4/11/2011	4/12/2011 & 6/22/11	6/21/2011	6/27/2011	6/27/2011	COMPLETE	**100**
Civil	Volume I - Construction Drawings	2/10/2011	Civil Drawing Comments	3/22/2011	4/11/2011	4/12/2011	6/10/2011	6/21/2011	6/22/2011	COMPLETE	**100**
Mechanical	Volume I - Construction Drawings	2/10/2011	Mechanical Drawing Comments	3/9/2011	4/15/2011	4/25/2011	5/23/2011	5/23/2011	6/7/2011	COMPLETE	**100**
Electrical	Volume I - Construction Drawings	2/10/2011	Electrical Drawing Comments	3/10/2011	4/18/2011	4/25/2011	5/3/2011	5/3/2011	5/4/2011	COMPLETE	**100**
Structural	Volume I - Construction Drawings		Not part of 65% design package	-	-	-	-	-	-	-	**-**
Architectural	Design Calculations	2/10/2011	Architectural Comments	3/8/2011	3/24/2011	3/30/2011	5/19/2011	6/3/2011	6/4/2011	COMPLETE	**100**
							TT sent 5/26/11				
Electrical	Design Calculations	2/10/2011	Electrical Comments	3/7/2011	3/25/2011	3/30/2011	4/10/2011	4/10/2011	4/10/2011	COMPLETE	**100**
Mechanical	Design Calculations	2/10/2011	Mechanical Comments	3/9/2011	3/25/2011	3/31/2011	4/15/2011	6/23/2011	6/29/2011	COMPLETE	**100**
						Rev 4/21/11 & 6/15/11	Rev 5/23/11				
Civil											
Hydrology	Volume II - Design Calculations	2/10/2011	TT Interim Design Review Memo	2/22/2011	3/14/2011	3/15/2011	3/27/2011	3/27/2011	3/27/2011	COMPLETE	**100**
Hydraulics	Volume II - Design Calculations	2/10/2011	TT Interim Memo, Civil Comments	2/22/2011	6/10/2011	NR	NR	6/21/2011	6/22/2011	COMPLETE	**100**
Geotechnical	Volume II - Design Calculations	2/10/2011	TT Interim Memo, Civil Comments	2/22/2011	6/10/2011	NR	NR	6/21/2011	6/22/2011	COMPLETE	**100**
Surveying	Volume II - Design Calculations	2/10/2011	TT Interim Memo, Civil Comments	2/22/2011	6/10/2011	NR	NR	6/21/2011	6/22/2011	COMPLETE	**100**
Structural											
Headrace Culvert	Topchi Structural Calcs 01	3/14/2011	Topchi HPP Structural Comments - 01	3/19/2011	5/3/2011	5/3/2011	5/9/2011	5/9/2011	5/9/2011	COMPLETE	**100**
Gravel Trap Flushing Canal	Topchi Structural Calcs 01	3/14/2011	Topchi HPP Structural Comments - 01	3/19/2011	5/3/2011	5/3/2011	5/9/2011	5/9/2011	5/9/2011	COMPLETE	**100**
Settling Basin Flushing Canal	Topchi Structural Calcs 01	3/14/2011	Topchi HPP Structural Comments - 01	3/19/2011	5/3/2011	5/3/2011	5/9/2011	5/9/2011	5/9/2011	COMPLETE	**100**
Head Pond Walls	Topchi Structural Calcs 01	3/14/2011	Topchi HPP Structural Comments - 01	3/19/2011	5/3/2011	5/3/2011	5/9/2011	5/9/2011	5/9/2011	COMPLETE	**100**
Gravel Trap Culvert	TopchiStrucCalcs02	3/17/2011	Topchi HPP Structural Comments - 02 and 03	3/20/2011	5/3/2011	5/3/2011	5/10/2011	5/10/2011	5/10/2011	COMPLETE	**100**
Settling Basin	TopchiStructCalcs03	3/19/2011	Topchi HPP Structural Comments - 02 and 03	3/20/2011	5/3/2011	5/3/2011	5/10/2011	5/10/2011	5/10/2011	COMPLETE	**100**
Aqueduct 1	TopchiStructCalcs04	3/23/2011	Topchi HPP Structural Comments - 04	3/27/2011	5/3/2011	5/3/2011	5/13/2011	5/13/2011	5/14/2011	COMPLETE	**100**
Aqueduct 2	TopchiStructCalcs05	3/30/2011	Topchi HPP Structural Comments - 05	3/30/2011	4/5/2011	4/14/2011	5/4/2011	5/9/2011	5/9/2011	COMPLETE	**100**
Powerhouse Building	TopchiStructCalcs06A	4/7/2011	Topchi HPP Structural Comments - 06A and 07	4/10/2011	4/28/2011	5/1/2011	5/12/2011	5/12/2011	5/12/2011	COMPLETE	**100**
Two Family Quarter Building	TopchiStructCalcs07	4/7/2011	Topchi HPP Structural Comments - 06A and 07	4/10/2011	4/28/2011	5/1/2011	5/12/2011	5/12/2011	5/12/2011	COMPLETE	**100**
Intake Flood Wall	TopchiStructCalcs08	4/8/2011	Topchi HPP Structural Comments - 08	4/10/2011	4/28/2011	5/1/2011	5/12/2011	5/12/2011	5/12/2011	COMPLETE	**100**
Powerhouse Roof Truss	PowerhouseTruss	4/29/2011	Topchi HPP Structural Comments - PRT	5/2/2011	5/19/2011	NR	NR	5/19/2011	5/19/2011	COMPLETE	**100**
Two Family Roof Truss	Two Fmaily Roof Truss Design	6/3/2011	via Email	NR	NR	NR	NR	6/3/2011	6/4/2011	COMPLETE	**100**
Technical Specifications											
	Civil	2/10/2011	Civil Comments	3/22/2011	5/4/2011	6/14/2011	5/4/2011	5/4/2011	6/14/2011	COMPLETE	**100**
	Hydro-Mechanical	5/24/2011	Hydro-mechanical tech spec comments	5/26/2011	5/31/2011	6/2/2011	6/7/2011	6/7/2011	6/8/2011	COMPLETE	**100**
	Electromechanical Powerhouse	2/10/2011	Electrical Comments	3/7/2011	3/25/2011	3/30/2011	4/10/2011	4/18/2011	4/10/2011	COMPLETE	**100**
	Electromechanical Substation	2/10/2011	Electrical Comments	3/7/2011	3/25/2011	3/30/2011	4/10/2011	4/18/2011	4/10/2011	COMPLETE	**100**

* Percent Complete refers to the level of completed effort in developing a 65% design package, not a 100% design package.
* NR= Additional Revisions Not Required

Drawing	ACEP File	ACEP File Received	Tetra Tech Comment File	TT Comments Sent	ACEP Responses Received 1	ACEP Responses Received 2	Status of 5/4/11 Submission	Status of 6/26/11 Submission	TT 65% Approval
General Layout Plan									
G-01	Construction Drawings					5/4/2011	No TT Comments	Submitted (GL-01)	Approved
Headworks General Arrangement									
GHW-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
General Project Layout									
G-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
Weir, Undersluice and Intake									
HW-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
HW-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
HW-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
HW-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
Gravel Trap									
GT-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Applied	Submitted	Approved
GT-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
GT-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
GT-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
Settling Basin									
SB-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
SB-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
SB-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
SB-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
SB-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
Canal Layout Plan & Profile									
L-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-06	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-07	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-08	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-09	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-10	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-11	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-12	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
L-13	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
Canal Cross Sections									
C-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-06	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-07	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-08	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-09	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
C-10	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
C-11	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
C-12	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
C-13	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
C-14	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
Aqueduct									
A-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
A-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
A-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Removed	N/A
A-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Removed	N/A
A-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Structural Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Removed	N/A
Headpond									
HP-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
HP-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
HP-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
HP-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
HP-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil/Mech/Struc Comments	3/8/2011, 3/22/2011, 3/9/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
HP-06	Construction Drawings	2/10/2011				5/4/2011	TT Comments Not Applied	Submitted	Approved
Penstock Layout Plan and Profile									
PP-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011	5/4/2011	No TT Comments	Submitted (PL-01)	Approved
PP-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (PP-01)	Approved
PP-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (PP-02)	Approved
PP-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (PP-03)	Approved
PP-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (PP-04)	Approved
PP-06	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (PP-05)	Approved
PP-07	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-02)	Approved
PP-08	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-02)	Approved
PP-09	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-03)	Approved
PP-10	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-04)	Approved

Drawing	ACEP File	ACEP File Received	Tetra Tech Comment File	TT Comments Sent	ACEP Responses Received 1	ACEP Responses Received 2	Status of 5/4/11 Submission	Status of 6/26/11 Submission	TT 65% Approval
PP-11	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-05)	Approved
PP-12	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-06)	Approved
PP-13	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-07)	Approved
PP-14	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-08)	Approved
PP-15	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (AB-09)	Approved
PP-16	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Civil Comments	3/8/2011 & 3/22/2011	4/12/2011		Drawing Not Included	Submitted (SS-01)	Approved
Powerhouse Details									
PH-01	Construction Drawings				4/12/2011		Drawing Not Included	Removed	N/A
PH-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
PH-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
PH-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
PH-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Applied	Submitted	Approved
PH-05	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
PH-06	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
PH-07	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
PH-08	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
PH-09	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
PH-10	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
PH-11	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
PH-12	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
PH-13	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
PH-14	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Submitted	Approved
PH-15	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
PH-16	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011		Drawing Not Included	Removed	N/A
PH-17	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
PH-18	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Applied	Removed	N/A
PH-19	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Struc Comments	3/8/2011, 3/22/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Removed	N/A
Generating Equipment and Switchyard Details									
E-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Electrical Comments	2/8/2011 & 3/10/2011	4/18/2011		TT Comments Applied	Submitted	Approved
E-02 a	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Electrical Comments	2/8/2011 & 3/10/2011		5/4/2011	TT Comments Applied	Submitted	Approved
E-02 b	Construction Drawings					5/4/2011	TT Comments Applied	Submitted	Approved
E-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Electrical Comments	2/8/2011 & 3/10/2011		5/4/2011	TT Comments Applied	Submitted	Approved
E-04	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Electrical Comments	2/8/2011 & 3/10/2011		5/4/2011	TT Comments Applied	Submitted	Approved
Family Quarter Buildings									
FQ-01	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Structural Comments	3/8/2011, 3/8/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
FQ-02	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Structural Comments	3/8/2011, 3/8/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
FQ-02								Submitted	Approved
FQ-02								Submitted	Approved
FQ-03	Construction Drawings	2/10/2011	Red Lined Dwg Markups & Arch/Structural Comments	3/8/2011, 3/8/2011, ongoing	4/12/2011	5/4/2011	TT Comments Not Applied	Submitted	Approved
FQ-03								Submitted	Approved
Penstock Crossing									
PP-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted (PC-01)	Approved
Culvert Crossing									
PP-02	Construction Drawings				4/12/2011		Drawing Not Included	Submitted (CC-01)	Approved
Flusing Gate Detail									
FG-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
FG-02	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
Operating Handle									
GD-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
Headrace Canal, Section									
HC-01	Construction Drawings				4/12/2011	5/4/2011	No TT Comments	Submitted	Approved
Handrail Detail									
HD-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
Intake Gate Detail									
IG-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
IG-02	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
Settling Basin Gate Detail									
SBG-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
SBG-02	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
Undersluice Gate Detail									
UG-01	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
UG-02	Construction Drawings				4/12/2011		Drawing Not Included	Submitted	Approved
Construction Joint Details									
CJ-01								Submitted	Approved

Attachment 2

Complete Design Review Comments

Design Review
TOPCHI HYDROPOWER PLANT
Drawings, Techical Specs, and Calculations
WO-LT-0034

Response Legend
A - Agree
D - Disagree
O - Out of Scope
AE - Agree with exception

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
CIVIL COMMENTS						
Gravel Trap						
1	AK	Drawings GT-02 to GT-04	The bottom limits of excavation are not adequately represented on all cross sections for the gravel trap, overflow channel, or flushing channel. For example, on Cross Section B-B', the bottom of the excavated area does not provide adequate cover between native soil and the proposed structure. The excavation should extend beyond the proposed structure by a minimum of 0.3 m on all cross sections.	A	Updated drawings show 300 mm of compacted gravel underneath all structures except for heaworks area (as the river bed and banks have natural gravel) and the anchor block + support piers (since these are along slopes, it will be difficult to lay gravel and compact - thus 0.15 mm of blinding concrete is to be placed beneath these structures). Note that based on discussions 300 mm of well compated gravel has been agreed	**A**
2	AK	Drawing GT-01	Show existing and proposed contours on the plan view and label all components of the proposed design (i.e. flushing channel, gabions, headrace canal, retaining wall, etc). The plan view should also clearly show surveying control points and offsets from known points in order to locate each structure in the field.	A	These comments have been incorporated in the updated drawings	**AE - TT/WI decided that proposed contours were not reqd on plans. Additional BMs added to the site during the June 4, 2011 site visit should also be added to the plan view.**
3	AK	Drawings GT-02 to GT-04	Each cross section should call out compaction requirements for backfilling prior to construction of the RCC gravel trap and channel including depth of compacted backfill and fill material requirements beneath proposed structures.	A	incorporated in the updated drawings	**A**
4	AK	Drawing GT-03 Section D-D'	The side wall height at the end of the gravel trap (left side wall of the weir) does not have sufficient freeboard above the high water level of 0.35 meters above the weir crest. The wall height should be increased to accommodate freeboard.	D	The normal water level in the gravel trap is 2395.90 m. This allows for 0.6 m of freeboard during normal desing flow conditions. During flood flow (100 yr return) freeboard in not provided as this is a rare event. 0.5 m of flow depth is the gravel trap spillway is sufficeint to retain & spill the 100 yr return flood flow from the gravel trap.	**A**
5	AK	Drawing GT-03 Section E-E'	The rectangular overflow channel downstream of the gravel trap overflow spillway is designed with a 2 meter width, 1 meter depth, and slope of 1:40. Assuming a manning's 'n' coefficient of 0.016, the resulting normal depth inthe overflow channel is 0.77 meters, leaving 0.23 meters of freeboard. It is recommended that the total depth of this channel be increased to provide a minimum freeboard of 0.60 meters, as recommended by the Indian Standards (IS 4745 - 1968 and IS 7112 - 1973).	A	TT/Winrock discussed in April and resolved freeboard issue, agreeing that a freeboard of 0.35m was sufficient.	**A**
6	AK	Volume II Annexes Page 21	The design calculations for velocity in the gravel trap assume a closed duct (pressure pipe) for calculating the 3.44m/s velocity in the channel, but flow through the gravel trap is governed by weir flow at the gravel trap outlet. The velocity in the gravel trap is not simply Q/A, rather it will be dependent on the outlet characteristics (weir length, tailwater height, design flow, etc). Thefinal design calculations should consider weir outlet velocities and design the length of the trap according to the maximum velocity over the weir.	,	See updated hydraulic calculations that were sent. During low flow when there will be open channel flow the velocity in the ggravel trap will be Q/A. During high flow when there is pressure flow in the upstream culvert, the velocity is indeed governed by outlet conditions. Due to the addtional head on the spillway weir, flows slighly higher than the design flow will be conveyed downstream to the settling basin. A second spillway is provided here.	**A - hydraulic calcs verified**
Desilting Basin						
7	AK	Drawings SB-01 to SB-04	The bottom limits of excavation are not adequately represented on all cross sections for the gravel trap, overflow channel, or flushing channel. For example, on Cross Section B-B', the bottom of the excavated area does not provide adequate cover between native soil and the proposed structure. The excavation should extend beyond the proposed structure by a minimum of 0.3 m on all cross sections.	A	Incorporated in the updated drawings. See response #1	**A**

Design Review
TOPCHI HYDROPOWER PLANT
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Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
CIVIL COMMENTS						
8	AK	Drawing SB-01	Show existing and proposed contours on the plan view and label all pertinent components of the proposed design (river bank wall, etc). The plan view should also clearly show surveying control points and offsets from known points in order to locate each structure in the field.	A	Incorporated in the updated drawings	**AE - TT/WI decided that proposed contours were not reqd on plans. Additional BMs added to the site during the June 4, 2011 site visit should also be added to the plan view.**
9	AK	Drawings SB-01 to SB-04	Each cross section should call out compaction requirements for backfilling prior to construction of the desilting basin and flushing channel including depth of compacted backfill and fill material requirements beneath proposed structures.	A	Incorporated in the updated drawings	**A**
10	AK	Volume II Annexes Page 22	The design of the velocities in the settling basins are incorrect. Flow in the settling basins is governed by weir flow at the outlet of the basins and velocity cannot simply be calculated using V=Q/A since this is open channel flow, not closed pipe flow as assumed on Page 22 of the Annexes. Tetra Tech's estimate of velocities over the weirs during peak flows is 1.0 m/s. The length of the basins should be redesigned to account for the maximum outlet velocity.	D	See updated calculations that have been sent. The calculations are based on standard settling basin guidelines. Flow through the weir will only occur when the flows are higher than the design flow. At other times flow along the upstream canal, ssettling basin and the outlet canal are governed by V= Q/A., i.e., same flow passes through wider cross sectional area in the settling basin. As most of the flood flows are spilled over the graavel trap weir, the settling basin weir will only have to handle marginal addtional flows that reaches this structure (due to higher head over the gravel trap spillway weir).	**A - hydraulic approach and calcs verified**
11	AK	Volume II Annexes Page 23, 24 and 25	The design approach for the flushing channels should be revised. Upon opening the flushing channels, the flow entering the channels will be Type 5 or 6 culvert flow with full flow at the entrance and free flow at the outlet. As the sediment is flushed, the flow will be governed by open channel flow. From the current design approach, it is unclear if the flushing channels are designed with sufficient velocity to flush sediment out of the channel and/or sufficient capacity to manage the design flow. Page 23 states that the required flushing velocity is 11.21 m/s but the design velocity shown on Page 24 2.849 m/s. In addition the calculations for "flushing channel after junction" are incorrect. The slope after the junciton is 1:100 not 1:300. These points should be clarified in the final design. (See Drawing SB-04, Cross Section H-H')	AE	See updated calculations that have been sent.	**A - flushing channel hydraulics verified**
12	AK	SB - All Drawings	Gate valve details (size, type, material, etc) should be specified on the drawings and in the technical specifications.	A	Separate hydro-mechanical gate drawings have been provided and comments on these have been received. See updated hydro-mechanical specifications which lists out the techincal requirements for the gates	**A - gate drawings have been reviewed and approved as part of the hydromechanical package.**
13	AK	Drawing SB-04 Cross Section F-F'	The elevations shown on Cross Section F-F' are incorrect (see reference to 2394.02 at the bottom of the flushing channel), please update.	A	Updated	**A**
Headpond						
14	AK	Drawings HP-01 to HP-05	The bottom limits of excavation are not adequately represented on all cross sections for the gravel trap, overflow channel, or flushing channel. For example, on Cross Section B-B', the bottom of the excavated area does not provide adequate cover between native soil and the proposed structure. The excavation should extend beyond the proposed structure by a minimum of 0.3 m on all cross sections.	A	Incorporated in the updated drawings. See response #1	**A**
15	AK	Drawing HP-01	Show existing and proposed contours on the plan view. Label aqueduct, gabions, and line on the north side of the headpond in the plan view. What does the line on the north side of the pond represent? Will there be a retaining wall there?	A	Incorporated in the updated drawings	**A - TT/WI decided that proposed contours were not reqd on plans**

Design Review
TOPCHI HYDROPOWER PLANT
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WO-LT-0034

Response Legend
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AE - Agree with exception

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
CIVIL COMMENTS						
16	AK	Drawing HP-01	The plan views should show surveying control points and offsets from known points to proposed structures, unless provided on a seperate set of survey control drawings.	A	Bench marks established during the survey work are shown in the general layout drawings	**AE - additional BMs added to the site during the June 4, 2011 site visit should also be added to the drawings.**
17	AK	Drawings HP-01 to HP-04	Each cross section should call out compaction requirements for backfilling prior to construction of the headpond including depth of compacted backfill and fill material requirements beneath proposed structures.	A	Incorporated in the updated drawings	**A**
18	AK	Drawing HP-05	The plan view on Drawing HP-03 lacks sufficient detail. The drawing should show all dimensions, excavation limits, slopes, details, and the point of re-entry of the spillway into the Bamyan River. Additional cross sections are necessary for the spillway channel after it transitions towards the Powerhouse building. The penstock inlet chamber, overflow spillway, and spillway channel transition to the Bamyan River bed need plan view details to show exact dimensions, wall thicknesses, and specifications of all three structures.	A	Incorporated in the updated drawings	**D - There still is no cross section on sheet HP-06 or Sheet PH-01 showing dimensions, material type, or geometry of the channel after it transitions into the existing gully. Please provide one cross section of the spillway channel within the gully on either sheet HP-06 or PH-01**
19	AK	HP-05, Section H-H'	Spillway side wall height only provides a freeboard of 0.25 meters above the HWL. This does not meet freeboard height requirements. Side wall height should be increased.	D	This free board is for 100 yr return flood not for normal/operating water level. During extreme flood, a nominal freebaord is sufficient.	**A**
20	AK	HP-03 and Volume II Annexes, Page 27	Penstock pipe diameter is incorrect on Drawing HP-03 and in Volume II - Annexes - on Page 27. Penstock inlet chamber and penstock pipe hydraulic calculations should be redone with the correct diameter of 1.8 meters, as referenced on Page 30 of the Annexes and shown on Construction Drawings PP-01 to PP-06.	A	See updated penstock calculations	**A - penstock calcs verified**
21	AK	HP - all drawings	All cross sections should show the bottom excavation limits. What type of soil is beneath the bottom layer of sand? Will it be compacted? What is the required compaction density? Is the native soil suitable for use beneath a storage pond or does it need to be ammended?	A	Comments incorporated in the updated drawings.	**A**
22	AK	Drawing HP-01	There appears to be a small drainage from the north at Cross Section F-F'. How will the design minimize ponding? Will there be storm water diversion berms above the headpond?		This dranage will be diverted to the spillway as shown in the updated plan - HP 01.and section FF in HP -03.	**A**
23	AK	Drawings HP-02 to HP-05	All headpond side walls should have compacted backfill **below and around** each footing and compaction densities should be specified.	A	incorporated in the updated drawings	**A**
24	AK	Volume II Annexes Page 29	Design of Spillway Canal: Design provides a freeboard of 0.25m. It is recommended that this be increased to 0.6 meters for the final design, as recommended by the Indian Standards (IS 4745 - 1968 and IS 7112 - 1973).	AE	TT/Winrock discussed in April and resolved freeboard issue, agreeing that a freeboard of 0.35m was sufficient.	**A**
Penstock Pipe						
25	AK	Drawings PP-01 to PP-06	Show proposed contours on the plan views. Label the penstock pipe, headpond spillway, penstock inlet chamber, powerhouse, and existing contours on each plan view.	A	Incorporated in the updated drawings	**A - TT/WI decided that proposed contours were not reqd on plans**
26	AK	Drawings PP-01 to PP-06	The plan views should show surveying control points and offsets from known points to proposed structures, unless provided on a seperate set of survey control drawings.	A	Bench marks established during the survey work are shown in the general layout drawings	**AE - additional BMs near the powerhouse (added to the site during the June 4, 2011 site visit) should also be added to the drawings.**
27	AK	Drawings PP-01 to PP-06	Each profile should call out compaction requirements for backfilling prior to construction of the penstock pipe, anchor blocks, and saddle supports including depth of compacted backfill and fill material requirements beneath proposed structures.	A	Incorporated in the updated drawings	**A**
28	AK	Drawings PP-01 to PP-06	Each anchor block acts as a transition point in pipe slope. Pipe inlet and outlet invert elevations should be provided, along with exact pipe slopes, transition pipe materials and construction methods.	AE	Levels will be provided along the updated drawings. Please explain what transition pipe materials mean?	**AE - my comment was aimed at requesting that the drawings clarify how the MS pipe sections will be connected to each other.**

Design Review
TOPCHI HYDROPOWER PLANT
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WO-LT-0034

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Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
CIVIL COMMENTS						
29	AK	Drawings PP-01 to PP-06	The alignment of the penstock pipe should be stationed horizontally and included on both the plan and profile views (0+00 to X+XX) for ease of construction. Exact starting stations and ending stations for each structure and transition should be shown on the profile view.	A	Will include in the updated drawings	**AE - please revise all stationing to be legible on drawings. Font is currently too small to read on all stationing.**
30	AK	Drawings PP-01 to PP-06	Each profile should call out "See Details on Sheet XX-XX" for each anchor block and saddle support. (ie. AB-2 on PP-01 should also have "See Details on PP-07"	A	Included in the updated drawings	**A**
31	AK	Drawing PP-03	Drawing lacks detail to show the construction of the penstock pipe beneath the roadway. How will the culvert be constructed and reinforced? Where are the limits of excavation? Will the RCC slab culvert be precast or cast in place? A separate drawing should include the details of the culvert and road crossing. If the road is to be demolished and reconstructed, road material and construction details should be included.	A	A separate drawing has been made	**A**
32	AK	Drawings PP-01 to PP-06	What do the lines offset from the penstock pipe approximately 10 meters represent? Are these excavation limits? A retaining wall? Please clarify.	A	These are excavation line - slopes towards the pesntock are shown.	**A**
33	AK	Volume II Annexes Pages 31, 32, 33	In calculating the head loss in the penstock system, the calculations consistently state that the velocity component is "0.316" but it should be "0.136". Please correct.	A	All hydraulic calculations have bee revised. See updated calcualtions	**A**
34	AK	Volume II Annexes Page 32	The calculation for pipe bend head loss does not show sufficient detail and may be incorrect.	D	They are correct. See updated calculations	**A**
35	AK	Volume II Annexes Page 33	Total h_e Design Calculations: The numbers provided for the calculation for total head loss do not match the head loss calculations performed in the previous 8 bullet points (a-h)		Hydraulic calculatrions have been updated	**A**
36	AK	Volume II Annexes Page 33	Generation Output Design Calcs: From where were the turbine, generator and drive efficiency values derived from? The drive efficiency value seems high, even when operating at maximum capacity.		These are standard efficiencis obtained from prospective suppliers. Note that the turbine and generator are directly coupled and thus no drives are required (i.e., both machines have the same RPM). See updated calculations	**A**
37	AK	Volume II Annexes Page 34	Design of Tailrace Canal: Design provides a freeboard of 0.25m. It is recommended that this be increased to 0.6 meters for the final design, as recommended by the Indian Standards (IS 4745 - 1968 and IS 7112 - 1973).	D	Freeboard has been agreed by TT & WI via exchange of emails	**A**
Headworks						
38	AK	Drawing HW-02	The side intake detail on HW-02 lacks sufficient detail. The location of the proposed trashrack is not clearly shown. HW-02 should include proposed elevations, dimensions, and details for all appurtenances associated with the intake structure.	D	GHW-01 shows the sectional view of the trashrack at the intake. Similarly, elavations and other details are shown in HW-02 (Sections A & B).	**A**
Aqueducts						
39	AK	Drawings A-01 to A-02	Show existing and proposed contours on the plan view and label all components of the proposed design (i.e. aqueduct, headrace canal, etc).	AE	TT & WI has agreed to only show existing contours & not proposed one. Components have been labled in the updated drawings.	**Agreed - TT/WI decided that proposed contours were not reqd on plans**
40	AK	Drawings A-01 to A-02	The plan views should show surveying control points and offsets to proposed structures, unless provided on a seperate set of survey control drawings.	AE	Permanent bench marks established have been shwon in the drawings along with their coordinates and elevations.	**Agreed - additional BMs added to the site during the June 4, 2011 site visit should also be added to the drawings.**
41	AK	Drawings A-01 to A-03	Each cross section should call out compaction requirements for backfilling prior to construction of the aqueducts including depth of compacted backfill and fill material requirements beneath proposed structures.	A	Included in the updated drawings	**A**
Headrace Canal Layout						
42	AK	Drawings L-01 to L-13	Show proposed contours on the plan view and label all components of the proposed design (i.e. headrace canal, gabions, etc).	AE	TT & WI has agreed to only show existing contours & not proposed one. Components have been labled in the updated drawings.	**Agreed - TT/WI decided that proposed contours were not reqd on plans. Please reduce the channel linetype thickness on all L sheets.**

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Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
CIVIL COMMENTS						
43	AK	Drawings L-01 to L-13	The plan views should show surveying control points and offsets to proposed structures, unless provided on a seperate set of survey control drawings.	AE	Permanent bench marks established have been shwon in the drawings along with their coordinates and elevations.	**Agreed - additional BMs added to the site during the June 4, 2011 site visit should also be added to the drawings.**
Canal Cross Sections						
44	AK	Drawings C-01 to C-14	Each cross section should call out compaction requirements for backfilling prior to construction of the canal including depth of compacted backfill and fill material requirements beneath proposed structures.	A	Included in the updated drawings	**A**
General (some repeated from previous comments)						
45	AK	General	Construction Control Point (CCP) coordinates should be called out on the Construction Drawings for the proposed new canal alignment and structural components/appurtenances with which a Contractor can readily establish/set centerline or offset staking at selected chainages in the field including breaks in the canal's horizontal alignment. In similar fashion to the control points shown in Figure 6 of the Volume II Annexes, Construction Control Points (CCPs), with coordinates and elevations, should be identified on the Construction Drawings for survey control purposes for all proposed structures.	AE	With the benchmarks shown in the updated drawings, the contractor/site engineer should be able to	**AE - additional BMs added to the site during the June 4, 2011 site visit should also be added to all drawing plan views.**
46	AK	General	Of all Construction Drawings, there appears to be only seven (7) ground-surveyed spot elevations on the existing ground surface and perhaps one on a building top or slab foundation as shown/indicated at the locations identified on Construction Drawing L-12, presumably along a Bamyan River tributary valley bottom area and just north of the existing canal alignment. Reference to the existing ground survey should be made in the final design.	D	The 7 "sponts" shown in the table are to show canal chanages, their coresponding elevations, water level etc. These are not ground elevations. The table is to guidle the contractor on formation level during construction	**A**
47	AK	General	No separate Survey Control Monumentation/Reference Drawing is presented nor is reference made to horizontal or vertical control datums as used for the purposes of design and preparing the Construction Drawings. Volume II – Annexes explains that an arbitrary horizontal and vertical datum was set at bench mark 1 (BM1) in a boulder along the Kabul-Bamyan highway. The instrument stations TP-1 through TP-30 and the bench mark locations should be shown on all Construction Drawings.	A	These are shown in the updated drawings L1-L13	**AE - additional BMs added to the site during the June 4, 2011 site visit should also be added to all drawing plan views.**
48	AK	Drawing G-01	Please reformat the General Construction Drawing sheets. Instead of including word documents as a title page, drawing list and list of abbreviations, Construction Drawing G-01 should become Construction Drawing G-03 and new sheets called G-01 and G-02 should be created. Typically, G-01 consists of general project information, as given in the word documents provided by Winrock entitled, "Cover_Page.doc" and "Page 1", showing the project title and list of drawings. The information on these documents should be transferred to a drawing entitled G-01. A Construction Drawing G-02 should contain "General Construction Notes" with a "List of Abbreviations". Construction Drawing G-03 then becomes the general project layout	D	The Title page and list of abbreviations etc are "not drawings" so these will not have drawing numbers. G-01 drawing "as is" shows the genral layout of the project". Thus WI will keep these numbers and not change them. Other updated drawings will anyhow have different numbers (integers) as a result of consolidating old drawings + adding new ones.	**A**
49	AK	General	Drawings and technical specifications do not address geologic hazards along the headowrks, canal, or headpond area. Final design documents should consider landslide prone areas and steep rock slope areas and construction methods for mitigating impacts from these hazards.	AE	The old debris area (~Ch 1+500) have been shown in the drawing. Gabion protection aling with reinforced culvert has been proposed along this stretch. Other geological/geotech issues such as bearing capcity and angle of friction etc have been addressed in the structural calculations (now agreed by both [parties) and drawings are being updated accrodingly.	**A**

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CIVIL COMMENTS						
50	AK	General	Standard canal design practice in the United States and India calls for a freeboard of 0.60 meter (United States Bureau of Reclamation (USBR) and Indian Institute of Technology Madras). A freeboard of 0.75 meter is recommended by the USBR for canal discharges in the range of 1.5 to 85 cms, and is even 0.60 meter for canal discharges in the range of 0.75 to 1.5 cms, which is less than the canal design discharge of 4.15 cms. Also, based on the Indian Standards (IS 4745 - 1968 and IS 7112 - 1973), a recommended design freeboard for a lined canal is 0.60 meter for all canal discharges less than 10.0 cms, and is 0.50 meter for an unlined canal for similar discharge conditions.	D	Freeboard issues have been resloved and both TT & WI have agreed to what it should be. Reference is made to email exchange between WI & TT	**A**
51	AK	General	Drawings do not currently show plans, details, or sections for the tailrace canal or overflow spillway channel after the headpond overflow spillway. These should be included in the final design drawings.	A	Will be included in the updated dtawings	**D - There still is no cross section on sheet HP-06 or Sheet PH-01 showing dimensions, material type, or geometry of the channel after it transitions into the existing gully. Please provide one cross section of the spillway channel within the gully on either sheet HP-06 or PH-01**
Technical Specifications						
52	AK	Technical Specifications (Civil)	In general, it is recommended that additional language be added to the technical specifications to guide the contractor in their submittal of construction methodolgy documents. As currently worded, the tech specs require the contractor to make decisions in the field that should be guided by the engineer prior to construction (such as diversion plans, access road design, materials testing requirements, QA procedures, earthwork protocol, excavation specifics (side slope requirements), construction joints, safety procedures, etc). If these technical specs are to be handed to mulitple contractors prior to construction, it is in the best interest of the project to establish construction method guidelines to be followed by each contractor rather than allowing them to determine the direction of construction procedures	A	These have been included in the updated specs	**A**
54	AK	Technical Specifications (Civil), Section 1.11	It is recommended that Winrock provide additional parameters or requirements in this section to guide the contractor in developing surveying control documentation to be submitted to and approved by the engineer.	AE	General requirements have been mentioned. Can you provide a sample indicating what the addional parameters are so that the comment is clear?	**A - specs are sufficient. On site survey Monuments have been provided by Winrock as of June 4 2011.**
55	AK	Technical Specifications (Civil), Section 1.13	It is recommended that Winrock provide additional parameters or requirements in this section to guide the contractor in developing documentation to be submitted to and approved by the engineer.	A	will include in the updated specs	**A**
56	AK	Technical Specifications (Civil), Section 2.1	Access road materials, depths, compaction densities, shoulder and drainage design should be specified in this section and on the drawings.	AE	These will be included in the updated specs & a typical section shown in the updated drawing	**A**
57	AK	Technical Specifications (Civil), Section 6	This section does not include any of the information gathered during the geotechnical investigation? How does our data about site soils affect our testing requirements? What specific ASTM standards should be used?	AE	getechnical investigations have been done by a local Afghan company. Reference can be made to these data. Tests sepcified include compaction test + standard concerte tests (e.g., cube test). Please provide sample ASTM standards to clarify this comment	**A - geotech survey report sufficient as on-site material reference.**
58	AK	Technical Specifications (Civil), Section 6.7	It is recommended that Winrock provide additional parameters or requirements in this section to guide the contractor in developing documentation to be submitted to and approved by the engineer.		General requirements have been mentioned. Can you provide a sample indicating what the addional parameters are so that the comment is clear?	**A - this is a repeated comment - the same as Comment #55 above, pelase ignore.**

Design Review
TOPCHI HYDROPOWER PLANT
Drawings, Techical Specs, and Calculations
WO-LT-0034

Response Legend
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Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
CIVIL COMMENTS						
53	AK	Technical Specifications (Civil), Section 7.3	Section 7.3 calls for the Contractor to determine if the final excavation surface is suitable and to "notify the engineer" if it is not suitable. Winrock should investigate subgrade soil characteristics prior to construction to determine the need for alternative backfill materials or required additional compaction of soil beneath all proposed structures.	AE	Based on geotech investigations, the compaction requirements have been specified and shown in the drawings. The intention here is to make sure that the Engineer is notified in case of surprises. The Engineer (i.e., consultant's team) is expected to be at site contineously but WI would like to cover this risk - i.e., requiring the contractor to notify the Engineer. In the updated specs, will add the sentence "The contractor shall notify the Engineer once the formation level is reached. Structures will be built only after the Engineer has approved the compaction requirements"	**A**
58	AK	Technical Specifications (Civil), Section 7.6	The Technical Specifications and Construction Drawings do not address the presence of local groundwater. The geotech report says groundwater is at 2.4m depth. Tech Specs call for dewatering upon the presence of groundwater during excavation. Based on the current design excavationd epths, etc, how will groundwater affect the proposed structure design and construction and how will groundwater be dealt with?	A	Ground water will be pumped out at the headworks area and made dry before constructing the structures. Other likely area where ground water could be present is the powerhouse. Ground water issue is not expected along the headrace alignment (at least at 2.4 m depth).Will add the pumping requirements to address ground water issue in the updated specs	**A**
59	AK	Technical Specifications (Civil) Section 9.4.10 and All Construction Drawings	Construction joint details are not shown on the Construction Drawings, rather, construction joints are only mentioned in the technical specification Sub-Clause 9.4.10 which cites that “Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be as indicated on the Drawings or as approved by the Engineer.” This should be civil/structural engineering design function/responsibility. How will the contractor proceed with construction in the field without the CJ details? What will be the size of the construction joints?	A	Consturcion joint details will be prepared as a separate package along with reinforcemetn drawings	**A**
55	AK	Technical Specifications and All Construction Drawings	No rock excavation, shoring protection, or foundation preparation/treatment specifications are presented. Could there be any local blasting in the rock required on this canal construction project?	AE	Accroding to the geotech report, for the depth of excavation required for the structures, bed rock is not expected. In case bed rock is found, it will have to be cleaned, joints removed and the structures built upon it (i.e., the bearing capacity will surely be higher than the design value of 98 kN/m2), i.e., bed rock in any case is not expected above the formation lelve. For security reasons (and logistic difficulties in acquiring blasting materials), WI will not specify any blasting work. Rather - Blasting will not be allowed.	**A**
56	AK	Technical Specifications (Section 15.3) and all Construction Drawings	There are no shoring or fall protection schemes for worker protection shown/identified on the Construction Drawings or presented/discussed in the Technical Specifications. Section 15.3 of the Technical Specifications is insufficient for providing exact details for shoring and fall protection during side slope excavation. These should be provided as part of the final design.	D	Comment not clear. General safety requirements have been mentioned in the spec. Please provide a sample drawing so that the comment is clear. WI'S intention here is to specify general safety requirement and then the contractor would come up with protection schemes based on facilites available.	**A - general safety reqmts are sufficient.**

Design Review
TOPCHI HYDROPOWER PLANT
Drawings, Techical Specs, and Calculations
WO-LT-0034

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CIVIL COMMENTS						
57	AK	Technical Specifications (Civil) and Construction Drawings	There is no mention on the Construction Drawings (in a General Notes section or otherwise) or in the existing Technical Specifications whether the new canal sections will be founded directly on a rock foundation or alluvial-type or outwash materials. Depending on the nature of the local surface and near-subsurface materials to be encountered during the canal construction, the excavated side slope conditions should also be varied along the entire canal alignment during the project construction, and certain site safety shoring protection may be required for the field workers. This site-safety aspect of the project construction is not presented in the Technical Specifications nor is rock or soil slope excavations with protection details illustrated/shown on the Construction Drawings.	D	Accroding to geotehc report, the canal alignment will on soils (allowable bearing capacity of 98 kN/m2 is recommended). General safety requirements have been mentioned. Can you provide a sample indicating what the addional parameters are so that the comment is clear?	**A - current tech specs are sufficient.**
58	AK	Technical Specifications (Civil) and Construction Drawings	Technical specifications nor construction drawings give product specifications or details for proposed appurtenances including gate valves, sluice gates, inlet chamber vent pipe, trashracks, etc. These should be included in the final design.	A	These are included in the hydromechanical sepcifications	**A - gate drawings have been reviewed and approved as part of the hydromechanical package.**

65% Design Review
TOPCHI HYDROELECTRIC POWER PLANT
drawings dated (Undated)
WO-LT-0034

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Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check	Second Response
MECHANICAL							
1	RT	Electro-mechanical powerhouse specification 1.1	The pipeline (penstock) thickness should be selected to have good stability (Not buckling) during transport. The water hammer pressure with 30% overpressure is a less critical case. The thickness could be ¼ in for 1.8 m diameter and 1/8 in. for 1.0 m diameter, and so it would have about 2.0 mm corrosion allowance. The penstock material should be stated on specifications. It is suggested ASTM A-36 or A-285.	AE	Min. thickness based on ASCE Manuals and Reports on Engineering Practice No 79 - "Steel Penstocks" for shipping and handling are: t(min) = D/288 and (D+200/400) where "D" is in inches. The thickness specified in Section 1.1 meets all these requirements. The penstock material is specified as IS2062 (FY = 410 MPa) in the Mechanical Specification as this steel is more readily avaiable there - but will add or ASTM A-36 / A-285.	According to ASCE No 79 the minimum thickness is 3. 5 mm for 1 m diameter and 6.25 mm for 1.8 m diameter. The corrosion allowance should not be considered as it will be transported new. The ASTM A-36 or A-285 will be cheaper as their yield point are lower than tha specified steel.	**WI would like to keep the thickness at 8 mm now since IS2062 is more likely to be available than ASTM A-36/A-285. Also steel plates of 6.25 mm or 7 mm are not readily available for IS2062 - next thickness is 8 mm.**
2	RT	Electro-mechanical powerhouse specification 1.11	Review the paragraph wording.	A	Reworded as follows: Penstock pipe specifications are specified in the Hydro-mechanical specification documents. Reference should be made to the Hydro-mechanical specification for penstock pipe material quality fabrication, delivery to site and installation.	**o.k.**	
3	RT	Electro-mechanical powerhouse specification1.12	Non destructive test should be performed on the welding, their extent and the acceptance code.	A	Non destructive test (dye penetration) specified. Please suggest what acceptance code should be used.	The acceptance criteria should be ASME B& PVC section VIII, division I.	**Included**
4	RT	Electro-mechanical powerhouse specification1.13	State the casting acceptance criteria and standard.	A	Please suggest criteria and standards	The acceptance criteria should be ASME B& PVC section VIII, division I.	**Included**
5	RT	Electro-mechanical powerhouse specification 1.14	State the maximum allowable tension and shear stresses for normal and emergency operation.	A	Stated in the revised specification	**o.k.**	
6	RT	Electro-mechanical powerhouse specification 1.16	The erection contractor should be the responsible for tests and the supply contractor should supervise the tests.	A	Revised as suggested	**o.k.**	
7	RT	Electro-mechanical powerhouse specification 2.1	Control should be made through a computer, and should be automatic and manual. This means that the unit could be started and operated manually by clicking on the computer screen step by step, with the computer supervisory system. The manual system for executing the starting or stopping sequences, taking the computer out is not recommended; instead there should be a back up computer. Equipment should be capable of being operated from its local control box or cubicle but only for testing purposes, and it should remain on automatic control mode.	A	Reworded as follows: The control shall be made through Microcomputer Automation System. It shall include Microcomputer monitoring and protection system. The system structure shall be 3 layered: Main Control Layer, Communication Layer and Local Control Unit (LCU). Main Control Layer shall manage the whole station, the Communication Layer shall provide safe and reliable communication with the use of single ethernet communication. LCU shall comprise protection and monitoring device on each local control box and shall have Programmable Logic Controller (PLC) + touch screen mode to ensure convenient and reliable operation.	It would be useful to add how local manual operation at the individual piece of equipment will be accomplished.	**For Manual control, operator should be trained and provided with operation manual by the manufacturer/installer (as per the type of equipment and supplier's specs). A general process for manual control is given in section 2.4. Manual computer based control would be difficult in a remote area of Afghanistan due to limited availability of trained computer operators.**
8	RT	Electro-mechanical powerhouse specification 2.2	The plant battery bank should have a power supply sufficient to allow the starting of three units, and to allow the black start of one of them. It should be provided a diesel engine for charging the battery bank in case of a long stand state.	A	Reworded as follows: "The plant shall have a 150AH Battery backup system and a 60 kVA Diesel generator set as back up for black start. " These are also shown in the Single Line Diagram.	**o.k.**	

65% Design Review
TOPCHI HYDROELECTRIC POWER PLANT
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WO-LT-0034

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MECHANICAL							
9	RT	Electro-mechanical powerhouse specification 2.4.2	The list of equipment ready to start should be completed with: forebay gate open, normal penstock pressure, bypass valve closed, speed governor available, braking system available, cooling water available (if needed), bearing lubricating system available (if needed), no alarms on, and no brakes applied. The needle valve mention should be eliminated as it does not apply for Francis units. (Pelton units is where it is used).	A	Only electro mechnical equipment list were mentioned. Now this specification has been revised to include forebay open, bypass gate closed etc. as suggested Needle valve removed from spec.	**o.k.**	
10	RT	Electro-mechanical powerhouse specification 2.4.3a	The pressure upstream and downstream the butterfly inlet valve should be balanced by the bypass and its control valve closed, before starting to open the wicket gates or guide vanes. The wording is not correct and should be corrected.	A	Udated as suggested	**o.k.**	
11	RT	Electro-mechanical powerhouse specification 2.5	The brakes should be applied and the excitation should be turned off in different way during normal stopping and during emergency stopping sequences.	D	Comments not clear. Stopping during normal and emergency conditions have been specified in 2.5. Please clarify comments or suggest what the different ways are for stopping should be.	The stopping sequences must include the brakes application and the excitation switch opening. This events are presented in different time for normal and emergency stopping sequences.	**During normal stopping, brakes are not applied and excitation switches are not opened.** **Emergency stop sequence modified in the TS. Starts with pushing the**
12	RT	Electro-mechanical powerhouse specification 3.1.1	The gross head should be corrected to 31.48 m instead of 35.0 m. The level 2359.22 m should correspond to the tail water level (TWL) instead of turbine centerline (TCL). It should be mentioned that in this case the rated conditions are the same as the design ones, if the generator rated power, stated on paragraph 4.1.4.b matches with the turbine power at the considered power factor (333.33 kW/0.8= 420 kVA instead of 465 kVA). The generator efficiency (91.0%=333.3/366) seems to be very low and 94.0% is more normal, with which the generator power could be raised to 344 kW (430kVA). Consider allowing the unit to operate at 750 rpm besides 1000 rpm, in order to let a supplier offer one standard turbine and to have the turbine floor over the tail water level avoid any power plant flooding, cavitation and vibration. This also would provide easy bearing lubrication system with grease or oil without cooling, especially during runaway speed.	AE	Gross head corrected. To generate 333.33 kW at 0.8 pf, the required apparent power would be = 333.33/0.8 kVA = 416 kW. Then since the power plant is at 2500 m above sea level, it has to be derated for altitude by dividing by 0.9. Thus 416/0.9 = 463 kVA. Therefore 465 kVA has been specified. Note that the turbine shaft power will be 366 kW and with 91% efficiency at the generator end, the power output will be 333 kW (after these derating factor). Once the equipment supplier is selected, these figures will have to be fine tuned based on actual data on efficiency (hill chart) availabe. Using 1000 rpm salient pole generator would be recommendable because of its cost effectiveness as compared to a 750 rpm generator. However, the option of 750 RPM is also included in the specification to allow flexibility for the supplier. On the other hand do note that the turbine RPM maybe close to 1000 for given site conditions (flow, head and no of units) necessitating 1000 RPM generator.	It must be specified that the turbine should be set above the tail water level, and that the supplier must provide the bearing cooling system if necessary for operating 30 min at runaway speed.	**Included**
13	RT	Electro-mechanical powerhouse specification 3.1.2.b	Specify the maximum cavitation volume loss according IEC 63607 or other equivalent (V_m = 120*D^2 where V is the material volume loss in cm^3 and D is the runner discharge diameter). Specify the maximum vibration displacement in three different axis according to zone A at rated speed in ISO 7919 or other equivalent. It is advisable that the three units of the power plant have a vibration monitoring system with alarm and shutdown switches for safety and maintenance.	A	Suggestions incorporated	**o.k.**	

65% Design Review
TOPCHI HYDROELECTRIC POWER PLANT
drawings dated (Undated)
WO-LT-0034

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MECHANICAL							
14	RT	Electro-mechanical powerhouse specification 3.1.3.a	The runaway speed should remain open, but it should be specified that at this speed the vibration should be the maximum according to zone B at runaway speed in ISO 7919 or other equivalent. The lower torsional and bending critical speeds should be at least 20% higher than the runaway speed. The unit rotor should be dynamically balanced at the site and in such a way that the residual unbalance will be lower than that specified in ISO 1940 for a quality grade G 6.3.	AE	If the runaway speed is not specified, the manufacturer will ask for higher price. Here the runaway speed has been specified to be in between 1.5 to 2.0 times the normal operating speed. Please suggest if the runaway speed is to be left open. Other comments have been incorporated	The runaway speed shoould be specified in such a way that the bidder offering a runaway speed higher than 2 Nn will not be eliminated.	
15	RT	Electro-mechanical powerhouse specification 3.1.3.b	The maximum over pressure could be specified as 30% of the static head as the penstock thickness is controlled by it transport conditions, and the speed rise should not be more than 40% of the rated speed not only for taking care of bearings and their lubrication, but also for stability reasons supplying power to an isolated network. In addition, specify the maximum vibration for this speed according to ISO 7919. To have good stability operating conditions, specify that the Tm >2*Tw^2, where Tm is the starting mechanical time and Tw is the starting water time.	A	Max 30% over pressure is specified for turbine. See Response 1 for penstock thickness. Speed rise has been specified as 40% for the turbine. Other comments have been incorporated	See comment to point 1.	
16	RT	Electro-mechanical powerhouse specification 3.1.7.a	The spiral case will not be embedded in concrete.	A	This sentence has been deleted	**o.k.**	
17	RT	Electro-mechanical powerhouse specification 3.1.7.c	The labyrinths should be made in stainless steel with higher hardness for the spiral case labyrinth and the softer for the runner labyrinth. The wicket gate gearing should be of self lubricated type. Review the gate operating ring wording. The servomotor internal cylinder wall and rod should be the chrome plated. Missing information: Specify the wearing plates on the covers surface close to the wicket gates.	AE	All comments addressed in the updated specifications except for "Specifying the wearing plates on the cover surface close to the wicket gates". Please suggest what the specification should be for this?	The head and discharge covers should be provided with a stainless steel plate or layer for avoiding cavitation and high velocity flow erosion between the this wearing plates or layer and the wicket gates.	

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A - Agree
D - Disagree
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MECHANICAL							
18	RT	Electro-mechanical powerhouse specification 3.1.7.d	It would be advisable to specify the maximum runner roughness such as 6 µm. The sub paragraphs i to v should be changed and independent of the runner specification. Specify the main shaft material as ASTM A-668 Class F or equivalent. The main shaft should have a stainless steel sleeve in the area in contact with the shaft seal. The flywheel should be designed to fulfill the overspeed and stability criteria stated in the comment to paragraph 3.1.3.b. In addition, it could be used as a braking disc with a compressed air or pressure oil applied braking shoes. If the compressed air system is used the contractor should supply the compressor and storing tank. It should be specified that the turbine bearing would be of the spherical roller or taper roller bearing, designed for a life L10 of 80.000 hours with 90% reliability, with the capacity to take the turbine axial thrust. It should be grease or oil lubricated with a maximum temperature of 65 °C at any operating condition, including runaway speed during 30 minutes, without water cooling. If water cooling would be necessary, the contractor should supply all the required equipment including the valves, pipes, filters, heat exchangers and so on.	A	All comments incorporated in the updated specification	**o.k.**	
19	RT	Electro-mechanical powerhouse specification 3.1.7.e	The shaft seal should be of the stuffing box type easily accessible from outside.	A	included	**o.k.**	
20	RT	Electro-mechanical powerhouse specification 3.2	The trunnions should have a stainless steel sleeve in the bearing area. The bypass line should have one (1) guard valves upstream of the needle valve that allows its maintenance without emptying the penstock. The bypass line should be dimensioned in order to have a pressure balancing time less than 2 minutes, regarding of the leakages through wicket gates and the wicket gates and wearing plates. The needle valve should be made with the needle of stainless steel.	AE	Included except for the "needle valve" comment	Both the needle and its seat must be in stainless steel since the flow velocity is high in this area when closing, and also for avoiding sticking of needle stems with bushing and seals.	

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MECHANICAL							
21	RT	Electro-mechanical powerhouse specification 3.3	The pressure should be 100 bar. The high pressure unit will supply pressure oil to the brakes shoes (If applicable). The sump tank should have a capacity to store 3 times the oil of all servomotors and pipes. The two (2) pumps should be mounted on the sump tank, with the electro-hydraulic actuator, safety and control valves, breather, temperature probes and indication. The return and suction lines should have filters. The pressure unit should have an accumulator formed by a bank of nitrogen bladders, provided with their shutoff valves and have one nitrogen bladder as a spare part erected in the bank.	A	included	**o.k.**	
22	RT	Electro-mechanical powerhouse specification 3.4	The speed governor should have PID compensation for the controlled signal, with several sets of adjustable parameters for synchronizing, and control the turbine wicket gates working in speed control on isolated network and power control connected to a network. The speed governor should be based on an industrial heavy duty desk top computer that should be supplied complete with CPU, LED screen, and printer. The governor should have all the speed switches for the starting and stopping sequences, alarm and protection, as well as the speed sensing device mounted on the unit shaft.	A	Reworded as follows: "The governor shall be programmable, computer controlled, comprising three main parts: Computer controlled governor, electro-hydraulic servo system and oil pressure unit. With PLC as the core component, the computer controlled governor shall measure and control the speed of turbine and openng of the wicket gates. The controller shall be Proportional Integrator Differentiator (PID) type.	It would be convenient specify that the speed governor should be able to control the power of the units operating connected to the network , if it could be possible in the medium term, for avoiding future expensive changes.	**Included**
23	RT	Electro-mechanical powerhouse specification 3.8	In the emergency shutdown test, provision to include the unit runaway test during 30 minutes.	A	Included	**o.k.**	
24	RT	Electro-mechanical powerhouse specification 4.1.2	The rotor for a generator running at 750 or 1000 rpm will be of silent pole type, not cylindrical.	AE	Can reword as follows" The generator shall be of salient pole type, with the rated speed of 750 RPM or 1000 rpm based on the turbine RPM.". However please also refer to Response #12	**o.k.**	
25	RT	Electro-mechanical powerhouse specification 4.1.4.b	Review the generator apparent power. For a 91% generator efficiency and 80% power factor it should be 420 kVA, and for a 94% generator efficiency and 80% power factor it should be 430 kVA.	AE	To generate 333.33 kW at 0.8 pf, the required apparent power would be = 333.33/0.8 kVA = 416 kW. Then since the power plant is at 2500 m above sea level, it has to be derated for altitude by dividing by 0.9. Thus 416/0.9 = 463 kVA. Therefore 465 kVA has been specified. Note that the turbine shaft power will be 366 kW and with 91% efficiency at the generator end, the power output will be 333 kW (after the derating factor). Once the equipment supplier is selected, these figures will have to be fine tuned based on actual data on efficency (hill chart) availabe.	**o.k.**	
26	RT	Electro-mechanical powerhouse specification 4.1.4.i	The generator neutral point should be connected to earth through a transformer and resistance to reduce the ground fault current.	A	The generator neutral earthing shall be done using neutral grounding transformer and shown in the revised Single Line Diagram.	**o.k.**	
27	RT	Drawing HP-03 Section G-G	Delete flared inlet Add slide gate at inlet	NA	This comment is not clear. Please elaborate	-	
28	RT	Drawing HW-02 Section A-A	The weir requires a deep cutoff of at least 5m or to bedrock whichever is less	A	Added as a note in drawing HW 02	-	

65% Design Review
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WO-LT-0034

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MECHANICAL							
29	RT	Drawing HW-03 Sections C-C and D-D	Identify gate sizes	AE	Gate sizes are specified in the hydromechanical drawings: IG01-02, UG 01 - 02, Openings are shown in these civil drawings and reference have been made to the hydro mechanical drawings.	-	
30	RT	Drawing PH-04 General	Provide a mechanical sheet using floor plan as background. Show the following: ·Bypass piping and valves Location of hydraulic power units and lines Identify valves and gates Identify pipe transitions Identify HVAC features	D	These details are to be provided by the slected supplier/manufacturer as the layout will be specific to the supplier. Only general layout of the equipment (turbine, generator,main valve control panel/room), erection bay have been shown at this stage to ensure that there is sufficient space.	-	
31	RT	Vol. 1 5.2.1	The return period of the diversion structure is only 100 years. What is the maximum probable flood?	AE	In the revised hydrological report the 100 yr flood was estimated at 477 m3/s and TT has agreed to this. Given that there is scarce hydrological data, it was not possible to estimate pmf within any reasonable accuracy range.	-	
32	RT	Vol. 1 5.3.4	Intake entrance velocity of 1.0 m/s is high.	D	For small hydropower plant with low diversion flow (limited 5 m3/s desing flow) 1,0 m/s is in acceptable range. Increasing entrance velocity requires wider intake increasing costs for civil structures and hydro mechanical gates.	**o.k.**	
33	RT	Vol. 1 5.3.6	Will the gravel trap sluice gates be operated manually or automatically?	NA	Since this plant will ne located at a remote area in Afghanistan, gravel trap sluice gates will be operated manually. The design ensures that manual operation is possble (taking into account lifting force required for the "head" acting on the gate leaves)	**o.k.**	
34	RT	Vol. 1 5.3.7	Flow velocity seems high in the settling zone.	D	The recommended horizontal velocity in settling basins for low head small hydropower project is 0.2 m/s- 0.25 m/s. We have 0.213 m/s which has also been further verified based on Stokes and Vetter's equations.	**o.k.**	
35	RT	Vol. 1 5.3.6	Dimensions of the gravel trap flushing grate are unclear.	D	Gate sizes are specified in the hydromechanical drawings: Openings are shown in these civil drawings and reference have been made to the hydro mechanical drawings.	**o.k.**	
36	RT	Vol. 1 5.3.8	The alignment of the canal should be modified to avoid upward slopes.	AE	To the extent possible, upward slope has been avoided. However, since most of the canal alignment follows the previous canal route, at some places this has not been feasible. Changing the canal alignment will require acquisition of new land which would cause further delay and perhaps add social problems.	**o.k.**	
37	RT	Vol. 1 5.3.10	The penstock material is identified as several different specifications. The thickness of the penstock could be reduced to 6.5 mm for the 1.8 meter diameter pipe and 4 mm for the 1 meter diameter pipe. The penstock should have erection and expansion joints between anchor blocks.	D	See Response 1 for penstock thickness, i.e., Min. thickness based on ASCE Manuals and Reports on Engineering Practice No 79 - "Steel Penstocks" 4 mm is surely too thin for 1 m dia and would buckle during transport.	See comments to question No 1.	**See Second Response #1**

65% Design Review
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MECHANICAL							
38	RT	Vol. 1 5.3.11	Recommend not using a Gantry crane. Recommend a traveling crane with I-beams on concrete columns and rails on top of the I-beams.	D	A travelling crane with I-beams on concrete columns will be expensive for such a small power plants (and this is conventionally called a gantry crane). Thus a mobile crane has been proposed instead (see page 42 first paragraph and powerhouse sectional drawings)	Is it easy to get a mobile crane there for normal maintenance after erection? If it is not true it would be better to install a crane on site.	**Yes, a moble crane is easy (and cost effective) for small hydropower plants. We have 3X333 kW units and the mobile crane would be used during installation and O&M. At other times it can be dismantled and stored. This would also decrease the cost of the powerhosue as the columns and beams take up less loads and corbels are not required**
39	RT	Vol. 1 6.1	TCL should be changed to TWL (tail water level)	A	Changed	**o.k.**	
40	RT	Vol. 1 6.1	The rated speed must be selected in order to have a positive submergence of at least one meter.	NA	Not sure what this means. Please elaborate	This means that the turbine should be 1m above the tailwater level, and will not be lowered as a result of turbine cavitation requirement as a result of high speed.	**Agreed. As shown in the drawings, this criteria has been met.**
41	RT	Vol. 1 6.1	The offerer should supply the turbine performance curve indicating the operating range with the cavitation and vibration limits.	A	Included in specification and mentioned in the main report	**o.k.**	
42	RT	Vol. 1 6.1	Over pressure and over speed should be defined as not exceeding 30%.	A	Updated in the main report for the turbine part.	**o.k.**	
43	RT	Vol. 1 6.1	The maximum metal temperature under normal operation should be less than 65 degrees C and under runaway speed of 75 degrees C.	A	Updated	**o.k.**	
44	RT	Vol. 1 6.6	There are no mechanical speed governors anymore.	A	Only electronic governor with oil/oil-less servomoter specified	**o.k.**	
45	RT	Vol. 1 Page 59	The schedule for equipment procurement is too short.	A	This depends on the supplier, In any case, 18 months has now been allocated.	**o.k.**	
46	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-01	Gates should conform to AWWA C501-92 and all other AWWA standards referenced therin				
47	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-02	The seating and unseating heads for the gates are unknown. Information regarding the design head for this gate should be provided. Manufacturer data regarding the seating and unseating head limits should be provided. The gates shall be designed and certified by the manufacturer to withstand the design head				
48	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-03	The manufacturer shall have experience in the production of substantially similar equipment and shall show evidence of satisfactory operation in at least 50 (fifty) installations. The fully assembled gates shall be shop inspected, tested for operation and leakage, and adjusted before shipping. There shall be no assembling or adjusting on the job sites other than for the lifting mechanism				
49	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-04	No information regarding guide rails or gate frames was included in this submittal. The drawings show that the gate would close directly onto the concrete structure, instead of a machined seal. The guide wheels would also roll directly within a concrete key. An integral frame and wall thimble for mounting should be considered				
50	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-05	Dimensions for other parts of the gates, such as shaft lengths, distance above ground, etc. should be shown on all drawings				

65% Design Review
TOPCHI HYDROELECTRIC POWER PLANT
drawings dated (Undated)
WO-LT-0034

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Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check	Second Response
MECHANICAL							
51	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-06	No information was included regarding the materials used in the construction of the gate. All materials should conform to standard materials as shown in AWWA C501-92. Several different materials are available for different gate components. Selected materials should be able to withstand design loads and long-term outdoor weather exposure. Is it intended for the gate to be a standard cast iron gate with bronze trim?				
52	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-07	Stem type should be specified as either rising or non-rising stem type				
53	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-08	Stem covers are not shown in the drawings. Covers may be required for outdoor exposure				
54	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-09	Mounting pattern for anchor bolts is not shown				
55	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-10	Drawings for each gate should be prepared and supplied by the manufacturer				
56	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-11	All cast iron parts of the sluice gate (not bearing or sliding contact) and stem guides shall be painted in accordance with the manufacturer's recommendations				
57	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-12	Electric or hydraulically operated actuators should be considered for the larger gates.				
58	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-13	The plan drawings for the gate structures show that there may be insufficient access space to operate the gates or perform any maintenance activities. It is recommend that a lateral clearance of 0.8 m between any part of the gate and the handrailing.				
59	RT	Dwgs. UG-01/02, IG-01/02, FG 01/02, SBG-01/02, GD-01, HD-14	There were no specifications for the design or construction of the gate. Please provide.				

Design Review
TOPCHI HYDROELECTRIC POWER PLANT
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WO-LT-0034

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ELECTRICAL COMMENTS						
E1.1	ML	Dwg E-01	In upper left, clarify designation/definition for "MCB" next to the branch circuit breakers.	A	Miniature Circuit Breaker	Agree
E1.2	ML	TS:E-M:PW, page 34	Paragraph c.i: Clarify if the intent is for Main Circuit Breakers "MCB" in all panelboards.	AE	This are Miniature Circuit Breakers for protection for each LV auxillary supply circuit in the PH	Agree
E2.1	ML	Dwg E-01	Center of drawing: the draw-out ACB on the 400-V side of the transformer bank isn't shown on the one-line diagram. It is called out as 2,500AT, 65kAIC in the spec.	A	will be added in the single line diagram	Done
E3.1	ML	Dwg E-01	In addition to a one-line diagram, a phasing diagram is required. The number of CTs are not shown on the drawing. The polarities are not shown. Three CTs are needed on the line side for the 87 relay and one to balance them on the Neutral side for each generator. Three CTs are also needed for the 50/51s.	AE	Since this is a single-line diagram only 1 CT is shown; there will be one CT per phase or 3 nos. in total and 1 for neutral; This will be mentioned in the diagram; phasing diagram is normally provided by the supplier;	Done
E4.1	ML	Dwg E-01	An 86 relay is needed to trip the ACBs and the VCB. It should also have a manual trip with a pistol grip.	AE	ACB and VCB will have manual trips with pistol grip; This is mentioned in the TS; 86 auxillary relay should be provided by the supplier as required;	Accepted
E5.1	ML	Dwg E-01	The drawings show discreet relays around the generators and transformers. Tetra Tech recommends Schweitzer Engineering Laboratories or equal solid state packaged relays.	AE	We assume/understand that the supplier will provide packaged relays as per the current trend	Accepted
E5.2	ML	TS:E-M:PW, page 26	Please provide design clarification as to why discreet relays specified. Consider solid state packaged relays with multiple functions in one enclosure.	AE	It is understood that all suppliers provide packaged relays.	Accepted
E6.1	ML	Dwg E-01	Please provide design clarification as to why ACBs are specified for generator protection. MCCB or ICCB are less expensive, more compact and very suitable for use at 600-V, 1,000AT. Provide justification for draw-out carriage circuit breakers. Consider proving a spare for future use.	D/ AE	Usual practice has been to use ACB for more than 400A; it is possible to replace with MCCB; Versitality of ACB is more than MCCB in terms of setting adjustments, draw out for maintenance, etc. 2 sets of spare trip and close coil for each ACB is mentioned in TS.	ACB should remain
E6.2	ML	TS:E-M:PW, page 27	Paragraph 10: Please provide design clarification as to why ACBs are specified for generator protection. MCCB or ICCB are less expensive, more compact and very suitable for use at 600-V, 1,000AT. Provide justification for draw-out carriage circuit breakers. Consider proving a spare for future use.	D/ AE	same as above	ACB should remain
E6.3	ML	TS:E-M:PW, page 28	Paragraph 11: Specific MCCBs with interrupting ratings "kAIC" (not "kA"). MCCBs require a magnetic trip element specified, not just thermal.	AE	kA rating is understood as interrupting or breaking capacity; Magnetic trip adjustable up to 400% of nominal rating is specified in the TS	Agree
E7.1	ML	Dwg E-01	Please provide design clarification as to why an isolator is needed between the generator ACB and the synchronization bus. It is redundant. Consider removing.	A	OK. Isolators will be removed.	Accepted

Design Review
TOPCHI HYDROELECTRIC POWER PLANT
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WO-LT-0034

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ELECTRICAL COMMENTS						
E8.1	ML	Dwg E-01	In the middle-right of the drawing: Provide design clarification why 400/110-V PTs are needed. Consider providing metering equipment that can accept 400-V direct input.	AE	PT will be optional for metering depending on source country/company; this has been mentioned in the TS;	Accepted
E9.1	ML	Dwg E-01	Middle of the drawing: The step up transformer bank has no protection shown. CTs and PTs need to be provided on the high and low bushings. Relays; Bucholz, 32, 50/51, 27/59 and 87 are needed leading to an 86.	AE	ACB will be added on the feeder side before transformer; Bucholz relay is specified in the TS. Three single phase transformers are only 500kVA each so protection provisions are nominal (refer to GE relay section guide)	Done
E10.1	ML	Dwg E-01	Indicate the feeder to the DC rectifier on the one-line diagram. Clarify if it is fed from the station service black start transformer or the power house auxiliary panelboard.	A	Added in the single line diagram; it is fed from the PH auxiliary panelboard	Done
E11.1	ML	Dwg E-02	Consider locating a three-phase step up transformer in the power house building (in the control room displacing the control gear to the store room) and the MV switchgear in the power hall across from the 400-V line-up. The switchyard would no longer be needed. The project would be more compact, cheaper and easier to maintain.	D	We believe that it will be more economical to place the transformer and switchgear outside as this would require a smaller power house building; this will also separate grounding mats for LV and MV and hence the low resistance (1 ohm) grounding mat will only be required for MV	Accepted
E11.2	ML	TS:E-M:SS	All of this section would have to be altered if the switchyard were replaced with indoor installations as described in Item E11.1 above.	D	no alteration recommended	Accepted
E11.3	ML	Vol I, page ix	Outdoor, oil filled transformers are called for. Consider "Less Flammable Fluid" transformers. Consider dry or LFF for indoor installation if Item E11.1 is considered.	D	outdoor transformer recommended as this would not require LFF	Accepted
E11.4	ML	TS:E-M:SS, page 5	Outdoor, oil filled transformers are called for. Consider "Less Flammable Fluid" transformers. Consider dry or LFF for indoor installation if Item E11.1 is considered.	D	same as above	Accepted
E12.1	ML	Dwg E-03	The fourth (spare) T1 transformer is not shown. Also, the T3 (station service) transformer is shown much larger than 50-kVA.	A	Agreed. Size will be suitably reduced.	Transformers' nominal datas should be written on the drawing, as well.
E12.2	ML	Vol I, page ix	A fourth transformer (spare) is called for.	A	Already included	Agree
E12.3	ML	Vol I, page 47	A fourth transformer (spare) is called for.	A	Already included	Agree
E12.4	ML	TS:E-M:SS, page 5	A fourth transformer (spare) is called for. Transformers are specified as 500-kVA, and not 420-kVA as elsewhere.	A	All will be changed to 500kVA	Accepted
E13.1	ML	Dwg E-04	The earthing mat requires bonding to the switchyard perimeter fence at several points for touch potential protection.	A	Will be shown in the drawing	Accepted
E13.2	ML	TS:E-M:PW, pages 42 and 43	Paragraph 3.c: TT knows from experience that a 1-ohm ground mat will be hard to achieve. Consider alternatives. Paragraphs g and h; 100-mm^2 cables are very large. - provide design calculations to verify correct sizing. The key to low ground resistance is the volume of soil engaged, not the size of the buried conductors.	AE	Riser ground conductors is changed to 50mm2 for the substation; standard practice is to specify 10ohm max for LV ground mat and 1ohm max for MV ground mat	Accepted

Design Review
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ELECTRICAL COMMENTS						
E13.3	ML	TS:E-M:SS, page 51	Paragraphs 8.5 and 8.6: same comment as E13.2 above.	AE	same as above	Accepted
E14.1	ML	Vol I, page vii	The Purpose is described as an isolated system. Verify future USAID plans to connect to NEPS and update.	AE	There is no NEPS network in the project area; demand for electricity exceeds that can be supplied by this plant; provisions can be added in future if the needs arise to connect to NEPS	Accepted
E14.2	ML	Vol I, page 23	The Project is described as an isolated system. Verify future USAID plans to connect to NEPS and update.	AE	same as above	Accepted
E14.3	ML	Vol I, page 49	Same comment as Item E14.2 above.	AE	same as above	Accepted
E14.4	ML	TS:E-M:PW, page 10	Paragraph 2.3; requires paralleling provisions to NEPS. It should read "to a NEPS, 20-kV feeder", not "National Grid" since the grid is at a higher voltage than 20-kV. This connection is to a NEPS feeder.	A	will be corrected; however it is unlikely that NEPS will reach the project area in the near term	Accepted
E14.5	ML	TS:E-M:PW, page 22	Paragraph 4.2.3; requires paralleling provisions to NEPS. It should read "parallel operation with NEPS utility feeders", not "Grid operation" since the grid is at a higher voltage.	A	will be corrected; however it is unlikely that NEPS will reach the project area in the near term	Accepted
E15.1	ML	Vol I, page 50	Define how "load shedding" will be achieved. Define if manual oversight will be required.	A	load shedding should be manually controlled at the distribution transformers; controlling this from the PH will require sophisticated remote control devices.	Accepted
E16.1	ML	Vol I, page 54	Table 1-1 has tasks summing to 5 months, not the six months Total net time shown in the bottom box.	A	will be corrected	Accepted
E17.1	ML	Vol I, page 63	Paragraph 9.3.3: The line is "medium-voltage distribution", not "high-voltage transmission". Paragraph 9.3.4 heading should be renamed "DISTRIBUTION LINE".	A	will be changed	Accepted
E18.1	ML	TS:E-M:PW, page 5	Paragraph 1.7: Wire insulation levels are not commonly specified throughout. 300-V insulation should be suitable for under 50-V control circuits, 600-V or by IEC standards, 1,000-V insulation for line voltage control and 400Y/230-V system circuits.	D	600V insulation is the commonly available insulation in this region for LV and control.	Accepted
E18.2	ML	TS:E-M:PW, page 25	Paragraph 5.1: Wire insulation levels are not commonly specified throughout. 300-V insulation should be suitable for under 50-V control circuits, 600-V or by IEC standards, 1,000-V insulation for line voltage control and 400Y/230-V system circuits.	D	same as above	Accepted
E18.3	ML	TS:E-M:PW, page 38	Paragraphs 3 and 7.5.2.a.i: Wire insulation levels are not commonly specified throughout. 300-V insulation should be suitable for under 50-V control circuits, 600-V or by IEC standards, 1,000-V insulation for line voltage control and 400Y/230-V system circuits.	A	changed to 1000V	Accepted

Design Review
TOPCHI HYDROELECTRIC POWER PLANT
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WO-LT-0034

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ELECTRICAL COMMENTS						
E18.4	ML	TS:E-M:PW, page 39	Paragraph b: Wire insulation levels are not commonly specified throughout. 600-V or by IEC standards, 1,000-V insulation for line voltage control and 400Y/230-V system circuits. TT would prefer 1,000-V. TT would also prefer 70C jackets (most commonly available in Afghanistan), not 65C or 75C as sometimes called for in these specs.	A	changed to 1000V; changed to 70C	Accepted
E18.5	ML	TS:E-M:PW, page 40	Paragraph c: Wire insulation levels are not commonly specified throughout. 300-V insulation should be suitable for under 50-V control circuits. Please provide design clarificaiton as to why control circuits require 2-5-mm ^{2} conductors? They could be as small as AWG#22.	AE	Except for CT secondary circuits other control circuits could be less than 2.5mm2 (say 1.5mm2)	Accepted
E18.5	ML	TS:E-M:SS, page 47	Paragraph 7.1: Wire insulation levels are not commonly specified throughout. 600-V or by IEC standards, 1,000-V insulation for line voltage control and 400Y/230-V system circuits. TT would prefer 1,000-V, not the 1,100-V specified here. TT would also prefer 70C jackets (most commonly available in Afghanistan), not the 75C as called for here.	A	changed to 1000V; changed to 70C	Accepted
E19.1	ML	TS:E-M:PW, page 5	Paragraph 1.5: Provide design clarification if "maintenance free batteries" to be "gel cell". Provide a more complete description.	AE	It can be Gel Cell or AGM batteries	Agree
E19.2	ML	TS:E-M:PW, page 31	Paragraph d: Provide design clarification if "maintenance free batteries" are to be "Lead acid". If so, consider "gel cell" for less maintenance DC storage.		It can be Gel Cell or AGM batteries	Agree
E20.1	ML	TS:E-M:PW, page 6	Paragraph 1.8: NEC Article 200 requires Neutral conductors to be white or gray colored insulation, not black as specified.	A	Changed to Gray	Accepted
E21.1	ML	TS:E-M:PW, page 10	Paragraph 2.2: Provide design clarification if "Black Start" power from NEPS through the Station Service Transformer. This seems to be a conflict with previous statements indicating that the plant is isolated.	D	Black Start will be done manually (hand pump). NEPS supply is not available for this.	Accepted
E22.1	ML	TS:E-M:PW, page 15	Paragraph d) first line: The sentence should read "4%", not "4&".	A	Will be changed	Accepted
E23.1	ML	TS:E-M:PW, page 34	Paragraph b.i.2: Specify electronic ballasts for fluorescent lamped fixtures.	A	OK.	Agree
E24.1	ML	TS:E-M:PW, page 34	Paragraph b.ii.1: Specify outlet type; Shucko, BS, etc. Specify a common outlet ampacity rating such as 13-A or 16-A.	AE	16 A Shucko type outlet recommended	Accepted
E25.1	ML	TS:E-M:PW, page 36	110-VDC system is specified elsewhere. Provide clarification if 48-VDC a typographical error.	A	changed to 110V	Accepted
E26.1	ML	TS:E-M:PW, page 38	Paragraph 3: "metal conduit" is insufficient specification. Provide detailed definition for approved/non-approved uses for EMT, IMC, RMC (such as GRS, RSC or RAC), etc.	A	EMT recommended for PH wiring	Accepted

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ELECTRICAL COMMENTS						
E27.1	ML	TS:E-M:SS, page 18	Provide design clarification outling the difference between the iv) Bucholz relay and the vi) Sudden Gas Pressure relay.	A	As this is a conservator type transformer, only Bucholz relay is adequate. Sudden Gas Pressure relay is removed.	Accepted
E28.1	ML	TS:E-M:SS, page 55	Paragraph 9.4.9: Provide statement that Incandescent lamps are not to be allowed. LED lamping should be allowed.	AE	Incandescent removed and LED added. High Pressure Sodium (HPS) lamps also added.	Accepted
E29.1	ML	TS:E-M:SS, page 56	Paragraph 9.4.9: Sodium lamps were not be allowed in the earlier list. Provide design clarification as to why they are allowed here.	AE	Both high pressure sodium or mecury lamps can be used for outdoor lighting; HPS prefered due to lower lighting pollution	Accepted
E30.1	ML	TS:E-M:SS, page 56	Paragraph 9.4.10: Provide design clarification as to what is "obviously included".	A	changed to included	Accepted
E31.1	ML	TS:E-M:SS, page 56	Paragraph 9.4.10: Provide design clarification as to why 16A receptacles and corresponding circuit breakers are not allowed. They are the most common available in Afghanistan and will best fit equipment plugs.	A	Changed to 16A	Accepted
E32.1	ML	TS:E-M:SS, page 56	Paragraph 9.4.10: Fault calculations need to include contributions from the generators, not just transformer let through.	A	Generator added	Accepted
M1.1	ML	Dwg PH-04	Consider providing heat in the Power House to prevent condensation. Physical comfort in the office spaces would also benefit from heating.	AE	Will recommend electrical heating in the power house to avoid condensation. Heating of offices and quarters will be optional and remain the decision of the management committee in light of high demand for power from the community.	Accepted

Design Review
TOPCHI HYDROPOWER PLANT
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ARCHITECTURAL COMMENTS								
Power House								
A-1	JH	General	The power house plans are schematic in nature. Is it the intention of the plans to provide bid level detail or to provide schematic level detail for use as a design build document?	O,D	The design undertaken is for Feasibility Level. Based on the competence of the selected contractor, the Consultant's team will provide details as necessary. In case of a competent contractor, with clarifications from Resident Engineer, he should be able to build the powerhouse structure	So Noted		
A-2	JH	PH-01	Include contour elevations for existing and proposed contours.	A	Included in the updated drawing	So Noted		
A-3	JH	PH-01	Plan is difficult to follow. Provide descriptive labeling on all proposed site features.	AE	PH-01 only shows the overview plan. Other details (machine layout, floor plan etc.) are shown in other drawings, e.g. PH-04. In PH-01, access road, drainage and spillway canal have been added.	Provide descriptive labeling on all proposed site features shown on this plan.	Labels have been added in the updated drawings. Will recheck and update labels as necessary	So noted
A-4	JH	PH-01	Text provided at various scales, some is illegible.	A	Updated.- All test sizes are now similar. Dimensions deleted as these can be seen from other drawings	So Noted		
A-5	JH	PH-01	Site features cannot be located on the ground based on the information provided. Provide coordinates for building and alignments.	O,D	Survey department national trigonometric points are not available at the site (similar to other places in Afghanistan). Thus, based on some benchmark established during the survey work, a site layout will have to be done by the design team during construction startup.	XYZ coordinates of the control points set and used during the survey should be shown on the plans along with a description of how they were established. This will allow the contractor to tie in to the existing survey and adjust it to his coordinate system as necessary.	Benchmarks that were established during the survey work has now been shown in the general layout drawings	So noted
A-6	JH	PH-02	Penstock is shown above grade at station 0+20 but missing from stations 0+30 & 0+40. Review sections for accuracy.	A	At 0+30 & 0+40 penstock will be buried. These are shown in the updated drawing	So Noted		
A-7	JH	PH-01 thru 03	These plans provide civil site information more than powerhouse section information.	D	Further sections and details are shown in other drawings, eg. PH-07 shows another section & 06 – shows elevations. Similarly other structural details & openings are shown separately.	So Noted		
A-8	JH	PH-04	If the penstock and tailrace canal are underground, consider dashing them for clarity.	A	Updated to show dash lines for buried component	So Noted		
A-9	JH	PH-04	Additional detail will be required to layout the connections into and out of the building	O	These will be provided at construction start up at site along with the selected contractor as national survey coordinates are not available as in other countries.	Survey coordinates are not necessary but fixeddimensions to the building should be provided. If the intention is to have the contractor design and build the facility this is acceptable.	Please clarify your response	The plans lacked sufficient information to identify the proposed location of the building
A-10	JH	PH-5	Provide flooring material labels.	A	Punning proposed on floor to keep cost down. Note added accordingly in the updated drawing.	So Noted		
A-11	JH	PH-5	Dimensions should be based on a single reference point, (outside of building or column lines) The unrelated dimension lines are difficult to follow.	D	The intent here was to show distances from column centre line (which is the reference point). Opening lengths are also shown for clarity. Also based on another reviewers comment (structural) the overhang dimensions are also shown.	So Noted		
A-12	JH	PH-06	How will the building exterior be finished? Will the frame actually be visible?	AE	The exterior will be plastered. Thus, the frame will not be visible. However, for clarity the frame (beams/columns) are shown in the drawings	Disagree; Frames should not be visible in elevations if they are not going to be visible in completed	Note has been added in the updated drawings	So noted

A-13	JH	PH-06	Will there be protrusions through the roof for chimneys?	AE	Based on the selected equipment manufacturer's requirements (e.g., air cooling for generator), chimney arrangements will be finalized. For general building cooling, ventilations have been provided.	Who will select the equipment? Where will the equipment be located? Plans should be revised to provide more guidance. The selected supplier will	Equipment selection will be based on bids submitted by the prospective suppliers.	So noted
A-14	JH	PH-06	Provide handrails at stairs.	D	Staircase not visible in Drawing 06. See Drawing PH-15 where handrails have been provided at stairs.	Agree		
A-15	JH	PH-08	Additional detail should be provided on intended materials and operation as well as details for the instillation of doors and windows.	AE	Metal rollup shutter is proposed for entry of vehicles etc into the powerhouse. For other openings "wooden" doors and windows have been proposed. However, if wood becomes more expensive than mild steel, then MS will be specified during start of construction (i.e., material specs for non structural part will have to be specified based on availability at time of construction)	This information needs to be added to the drawing if not already done so. Verify upon receipt of revised drawings	These are included in the updated drawings	So noted
A-16	JH	General	No plans are provided to address mechanical, electrical or plumbing.	D	Drawings for hydro mechanical gates and other parts have been provided. Mechanical, electrical and plumbing plans differ from manufacturer to manufacturer in small hydropower plants. These details are provided by the manufacturer in the tender document.	Mechanical, electrical or plumbing comment refers to the building itself, not the hydropower equipment.	There are no mechanical system in the powerhouse. Plumbing system depends on what is available locally. Plumbing quality has been specified in the hydro mechanical document and. The electromechanical equipment supplier will be responsible for powerhouse lighting system	We have reservations about these comments. Do the documents describe what plumbing is required in the building? The electromechanical equipment supplier is responsible for the lighting? Not the building contractor? We will review this is part of the final document submission
A-17	SL	PH-04 THRU 07	Add gridlines to all plans.	A	Added	So Noted		
A-18	SL	General	Add roof overhang dimensions.	A	Added	So Noted		
A-19	SL	PH-05	Add drawing scale.	D	Graphical scale already provided inside title box. See bottom right hand corner next to "Drawing No"	Some scales are illegbale. Clarify specific scale for each drawings (i.e. 1:5) and also provide graphic scale	The scales have been revised to make them legible. Specifying scale such as 1:5 will lead to misinterpretation as this depends on the print size. Thus, we suggest that only graphical scale be included.	So noted
A-20	SL	PH-06	Add drawing scale and dimensions.	D	Graphical scale already provided inside title box. See bottom right hand corner next to "Drawing No" Dimensions not shown in this drawing as these can be read from other drawings. The intention here was to show the elevations and the architectural view from various faces	Agree on dimensions, See back check comment to A-19 for drawing scale	See response A19	So noted

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check	Second Response	2nd Back-Check
ARCHITECTURAL COMMENTS								
A-21	SL	PH-06	Clarify change in building frame at overhead door location.	AE	This is to provide a larger opening through the	Agree		
A-22	SL	PH-06	Clarify how gable ends of roof will be enclosed.	A	Walls will be extended and the main truss members (top) will rest on these to connect to the internal	So Noted. Provide detail on the plans.		
A-23	SL	PH-07	Section XX - Are walls continuous to underside of roof? Clarify how this will work with truss design.	NA	Comment not clear. Wall is continuous at the periphery. Trusses rest on columns and some internal ones in beams as shown in the drawings.	Drawing not clear, requires a higher level of detail to convey intent		
A-24	SL	PH-07	Section ZZ - Clarify stair section and handrails.	AE	Both are shown in the drawing. Should these be labeled for clarity?	Label and show handrails on both sides of stairs.	Hand rails were already shown in one side. Along the wall side hand rails are not required. See response A-26	So noted
A-25	SL	PH-08	Clarify vertical dimension of door frames.	A	Dimensions given in the updated drawings	So Noted		
A-26	SL	PH-15	Add handrails to stairs plan and section. Clarify clear distance between handrails	AE	Hand rail on plan and section already shown. The	So Noted		

A-26	JE	FH-15	Add handrails to stairs plan and section. Clarify clear distance between handrails.	AE	Distance between handrail (250 mm) mentioned in	So Noted		
Two Family Quarters								
A-27	JH	General	The house plans are schematic in nature. Is it the intention of the plans to provide bid level detail or to provide schematic level detail for use as a design build document?	O,D	Same response as in A1above. These are intended to be one storey simple	So Noted		
A-28	JH	General	Check the page numbering in the title blocks. Numbering is inconsistent.		Will recheck and verify. The first two letters	So Noted		
A-29	JH	FQ-01	Rafter and Purlin Detail - Include ceiling material in the section. Include detail to attach ceiling material to rafter.	AE	Roof to be covered with CGI sheets as shown in the 4 mm commercial ply specified in Note for ceiling	Notes on drawing do not currently specify ceiling materials or recommended	This has been added in the updated drawings and in the civil speci9fications	So noted
A-30	JH	FQ-01	How will the area between the rafters be filled?		Comments not clear. Please elaborate	Will there be insulation? Refer to back-check comment A-39		
A-31	JH	FQ-01	Selection of pipes for rafters is unusual. Please provide rational for use.	D	Pipes are easily available compared to angles in the area. Steel fabricators are used to pipes in the region. Pipes are widely used as rafters in Afghanistan and Pakistan.	Disagree	Disagree. With angles, or other none pipe sections, a higher level of precision is required with gusset plates and connections with nut and bolts. With pipes welded together fabrication and installation are simple. In Northern areas such as Badakshan pipe trusses area commonly used.	We continued to disagree with your assessment regarding the level of effort and quality regarding pipe trusses. It seems reasonable to expect the contractor on a project of this magnitude could obtain steel pipe but not other steel structural sections.
A-32	JH	FQ-01	Provide roofing detail with rafter and purlin spacing. Include connection detail.	D	Details will have to be provided later based on metal fabricator's skill. e.g. if a local fabricator is awarded this job such as to encourage local entrepreneurs) he is more likely to weld the perlin into the rafter. On the other hand if an external experienced fabricator is selected, he is likely to use connection plates (purlin plates connected to	Recommended purlin spacing should be added to insure structures capability to support required loads	Purlin spacing added in the updated drawings	So noted
A-33	JH	FQ-01	Include material labels in sections.	AE	Materials are indicated in Notes. Will include a legend/key in the updated drawing	Notes do not cover all materials. Verify changes upon receipt of revised drawings		
A-34	JH	FQ-01	Note 7 references Drawing MPH-40-C01, where is this located?	A	This has been amended. Drawing is to be read in conjunction with FQ-02.	So Noted, Verify upon receipt of revised drawings		
A-35	JH	FQ-02	Room dimensions do not correspond to dimensions indicated.	D	Room dimensions are internal to indicate the actual space available	So Noted, Consider using dimension strings to show interior limits of rooms. Show area (square meters) under room name		
A-36	JH	FQ-02	Dimensions should be based on a single reference point, (outside of building or column lines). The unrelated dimension lines are difficult to follow.	D	The intent here was to show distances from wall centre line (which is the reference point). Since the wall thickness is known, reference from outside/inside of building walls can be deduced.	Wall thickness is not consistent based on notes. So Noted		
A-37	JH	FQ-02	Column lines Aa and C are not dimensioned.	D	With other dimensions provided, the Aa, C and 2a distances can be deduced. These dimensions are not included as there are already too many dimensions in the drawing congesting it.	Consider reorganizing dimension strings to improve clarity of drawing		
A-38	JH	FQ-02	Note 18 references Drawing MPH-40-C02, where is this located?	A	Amended	So Noted		
A-39	JH	FQ-02	Note 15 calls for 4mm commercial ply, but no insulation.	AE	Could consider insulating the ceiling using fiber glass wool. Or please suggest alternative.	Add insulation type to note. Fiberglass batt insulation is acceptable if it is available		
A-40	JH	FQ-02	The building has no heat or insulation.	D	Apart from insulating the ceiling, it will be difficult to insulate/heat other areas in Afghanistan.	So Noted, Show on drawings		

A-41	JH	FQ-02	Provide counter dimensions.	NA	Please specify what counter dimensions mean.	Plan dimensions and height of kitchen counters (where range and sink are located)		
A-42	JH	FQ-02	Include materials on elevations.	D	Elevations are included to show the architectural Should stone masonry wall be shown in elevation	If there is a visible pattern to the finish show on elevations		
A-43	JH	General	No plans are provided to address mechanical, electrical or plumbing.	D	This are staff quarters and thus the comment Electrical and pluming details are done by the local	The plans should clearly identify what MEP components the contractor shall include.		
A-44	SL	FQ-01	Clarify how roofing is attached to purlins.	D	See comment A29	Roofing Material is stated, connection is not		
45	SL	FQ-01	Add purlin spacing, overhand dimensions, grid, and dimensions to Section AA and BB.	A	Included in the updated drawing	So Noted		

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check	Second Response	2nd Back-Check
ARCHITEC	**TURAL COMMENTS**							
A-46	SL	FQ-01	Clarify how gutter is attached to roof structure.		Hooks connected to the rafter end plats will be provided at intermediate lengths. The detailed drawings will have to be finalized once the gutter is procured.	Show some type of connector strap on drawings. Add note that specific connection method will be according to gutter manufacturer's recommendations	Note added in the updated drawings	So noted
A-47	SL	FQ-01	Clarify intent on closing soffits. Roof/soffit vents?	AE	Open soffits when not well installed and maintained cause leaks. Also, soffit vents are not in common practice in Afghanistan.	Drawing needs to show some type of material enclosing soffit. Has no effect on if it is vented or not.	Will 4 mm marine ply connected to the bottom rafter be OK. This is what has been proposed as the false ceiling inside. If so, will add a note as this will not be visible in the drawings	Marine Plywood is several times more expensive than common plywood. If it has been determined that the moisture level at roof soffits is at such a level to require marine plywood then is it acceptable. However 4mm is very think stock consider 18mm instead.
A-48	SL	FQ-02	Consider making floor plan sheet #1.		Comment not clear. Should a single sheet be made for the plan and what purpose will it serve?	Typically sheet showing floor plans precedes section in drawing set. Section is referenced from plan so one needs to see the plan before the section	OK.	So noted
A-49	SL	FQ-02	Clarify if there is to be a shower/tub in each bathroom.	AE	A shower is provided in each bathroom.	Show this on drawings and add note specifying typical bathroom components (i.e. toilet, lavatory, and shower stall)	Shown in updated drawing	So noted
A-50	SL	FQ-02	Verify only one exit per unit.	NA	Is this for privacy as it implies constructing an intermediate wall (or partition) at the veranda? Is As proposed a common veranda is provided for two families. A partition wall at the veranda center can be built if required during construction.	Verify that building code allows one exit per unit for this building	As far as we are aware, IS Building codes does not specify more than one exit for a single storey house. Let us know if this is not the case.	So noted

A-51	SL	FQ-02	Clarify material and size of steps.	AE	Material is stone masonry and size of steps are shown in the drawing (see dimensions shown).	Label material on drawing	Labeled	So noted
A-52	SL	FQ-02	Clarify operable/stationary parts of windows.			Show this on the drawings	Shown	So noted
A-53	SL	FQ-02	Label materials to be used on elevation.	AE	Except for the middle window which is fixed, others(sides and ventilations) are operable	Response appears to be for comment A-52. No response provided for comment A-53	If materials are shown in sections, do they need to be shown in elevations as well?	If they are clearly labeled and defined in one location it is not nessecary to label multiple times
A-54	SL	FQ-02	Note #3 says 250mm wall. Other notes and drawings say 450mm walls. Consider reducing wall thickness as 450mm seems excessive.	D	All walls are 450 as these are load bearing walls and insulation (on walls) has not been provided. Thus 450 mm will be required (also commonly used in the country for single storey local houses)	So Noted. Make sure notes and drawings are consistent, all should say 450mm walls	Incorporated	So noted
A-55	SL	FQ-02	North and South elevations show and label gable end rake thickness and material.		Roof is CGI and masonry wall extends to the roof as one unit. Please clarify comment?	The graphic shows a single line with no thickness. This is not	Updated in the drawings	So noted
A-56	SL	FQ-02	Clarify if "size" on opening schedules is rough opening size.	AE	Openings are "clear openings". However based on standard windows that maybe available locally, the opening can be adjusted by the resident engineer during construction.	So Noted		

Design Review
TOPCHI HYDROPOWER PLANT
drawings dated (Undated)
WO-LT-0034

Response Legend
A - Agree
D - Disagree
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AE - Agree with exception

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STRUCTURAL COMMENTS						
Headrace Culvert						
S-101	BRO	Topchi Structural Calcs 01: PDF Page 12 - Figure: Headrace Culvert Reinforcement Bars	This section must have bars going into the page. Add "Each Way" to reinforcement leaders and show reinforcement when detailing rebar.	A	"each way metnioned in the updated drawing"	OK, waiting for updated calculations and drawings.
S-102	BRO	Topchi Structural Calcs 01: PDF Page 13 - Stability of Culvert Section page 1 of 2	This section of the culvert is underground. Does the reinforcement design account for the soil and seismic forces at the greatest depth?	A	Yes, forces including seismic are taken at greatest soil depth	OK, waiting for updated calculations and drawings.
S-103	BRO	Topchi Structural Calcs 01: PDF Page 13 - Stability of Culvert Section page 1 of 2	Coordinate Total Height of the Culvert with drawings. Drawing shows total height of the culvert to be 1.80 m but design uses 2.00m. (See Drawing GT-02 Section B-B)	D	Design Model based on center line so that forces are symmetrc whereas drawings show inner and outer dimensions.	OK, waiting for updated calculations and drawings.
S-104	BRO	Topchi Structural Calcs 01: PDF Page 13 - Stability of Culvert Section page 1 of 2	Coordinate Angle of internal friction of soil with Geotechnical Report. In the report it is considered 20.1 degrees but the design assumed 30 degrees.	A	updated calculations include 20.1 degrees which is the geotech recommended internal angle of friction	OK, waiting for updated calculations and drawings.
S-105	BRO	Topchi Structural Calcs 01: PDF Page 13 - Stability of Culvert Section page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	23.6 kN/m3 used through out	OK, waiting for updated calculations and drawings.
S-106	BRO	Topchi Structural Calcs 01: PDF Page 13 - Stability of Culvert Section page 1 of 2	Update Dead Load and Seismic Loads if unit weight of concrete changes.	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-107	BRO	Topchi Structural Calcs 01: PDF Page 23 - Rebar Headrace Culvert	The second line specifies 12mm bar spaced every 150mm. Appears to be input error. Please confirm.	A	yes, 200 mm mentioned in the updated calculation	OK, waiting for updated calculations and drawings.

Design Review
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drawings dated (Undated)
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A - Agree
D - Disagree
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AE - Agree with exception

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STRUCTURAL COMMENTS						
Gravel Trap Flushing Canal						OK, waiting for updated calculations and drawings.
S-201	BF	Topchi Structural Calcs 01-PDF Page 106 - Gravel Trap Flushing Canal Stability Cal. Page 1 of 2	Coordinate the Bottom Slab Thickness with drawing. Drawing shows slab thickness to be 0.2m but design uses 0.3m.	A	Drawing updated & now shows 0.3 m.	OK, waiting for updated calculations and drawings.
S-202	BF	Topchi Structural Calcs 01-PDF Page 106 - Graval Trap Flushing Canal Stability Cal. Page 1 of 2	Coordinate the Length of Slab Inside Walls with drawing. Drawing shows length to be 1.0m but design uses 1.4m.	A	Drawing updated & now shows 1.4 m.	OK, waiting for updated calculations and drawings.
S-203	BF	Topchi Structural Calcs 01-PDF Page 106 - Graval Trap Flushing Canal Stability Cal. Page 1 of 2	Coordinate Angle of internal friction of soil with Geotechnical Report. In the report it is considered 20.1 degrees but the design assumed 30 degrees.	A	updated calculations include 20.1 degrees which is the geotech recommended internal angle of friction	OK, waiting for updated calculations and drawings.
S-204	BF	Topchi Structural Calcs 01-PDF Page 106 - Graval Trap Flushing Canal Stability Cal. Page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	23.6 kN/m3 used through out	OK, waiting for updated calculations and drawings.
S-205	BF	Topchi Structural Calcs 01-PDF Page 106 - Graval Trap Flushing Canal Stability Cal. Page 1 of 2	Please update the dead load and seismic load with units and also your seismic load values are missing, please provide.	D	Units are in KN and mentioned in trhe calculations. Seismec load have also been included. See STAADPRO output attached	OK, waiting for updated calculations and drawings.
S-206	BF	Topchi Structural Calcs 01-PDF Page 106 & 107 - Graval Trap Flushing Canal Stability Cal. Page 1 of 2 & 2 of 2	It seems that there any value is messing in input, and the values in these cells are not clear, Max and Min Bearing, Load Combinations, Result of All cases and Bearing Envelope, Please update Acoordingly.	D	Load combinations in pages 1 &2 are to show the various combinations used in the STAADPRO calcuations. The results incldluing load envelopes are are inculded in the STAADPRO output in the later pages.	OK, waiting for updated calculations and drawings.
S-207	BF	Topchi Structural Calcs 01-PDF Page 108 - Graval Trap Flushing Canal STAAD Report. Page 1 of 12	Please Coordinate the Modulus of Elasticity of Concrete input to STAAD with the value Provided in general design narative," 3.Details of Analysis and design" Topchi Structural Calcs 01-PDF Page 3.	A	Updated narrative and calcualtions use 21718456 kN/m2	OK, waiting for updated calculations and drawings.
S-208	BF	Topchi Structural Calcs 01-PDF Page 120 - Graval Trap Flushing Canal Rebar Calculation Chart. Page 1 of 1	Please provide a detailed calculation with formulas which are used in the cells of this spread sheet.	D	Spreadsheet was sent earlier. We can send you the spreadsheet again to trace the formula used.	OK, waiting for updated calculations and drawings.
S-209	BF	Topchi Structural Calcs 01-PDF, General	Please provide description or Legend for Names and symbols used in your design analysis sheets.	AE	Most input parameters have legends and symbols, for the missing ones these have been added.	OK, waiting for updated calculations and drawings.

Design Review
TOPCHI HYDROPOWER PLANT
drawings dated (Undated)
WO-LT-0034

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A - Agree
D - Disagree
O - Out of Scope
AE - Agree with exception

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STRUCTURAL COMMENTS						
Settling Basin Flushing Culvert						OK, waiting for updated calculations and drawings.
S-301	BRO	Topchi Structural Calcs 01: PDF Page 219 - Figure: Settling Basin Flushing Culvert Before Merging Rebar	This section must have bars going into the page. Add "Each Way" to reinforcement leaders and show reinforcement when detailing rebar.	A	"each way metnioned in the updated drawing"	OK, waiting for updated calculations and drawings.
S-302	BRO	Topchi Structural Calcs 01: PDF Page 219 - Figure: Settling Basin Flushing Culvert After Merging Rebar	This section must have bars going into the page. Add "Each Way" to reinforcement leaders and show reinforcement when detailing rebar.	A	"each way metnioned in the updated drawing"	OK, waiting for updated calculations and drawings.
S-303	BRO	Topchi Structural Calcs 01: PDF Page 220 - Stability of Culvert Section page 1 of 2	This section of the culvert is underground. Does the reinforcement design account for the soil and seismic forces at the greatest depth?	A	Yes, forces including seismic are taken at greatest soil depth	OK, waiting for updated calculations and drawings.
S-304	BRO	Topchi Structural Calcs 01: PDF Page 220 - Stability of Culvert Section page 1 of 2	Coordinate Angle of internal friction of soil with Geotechnical Report. In the report it is considered 20.1 degrees but the design assumed 30 degrees.	A	updated calculations include 20.1 degrees which is the geotech recommended internal angle of friction	OK, waiting for updated calculations and drawings.
S-305	BRO	Topchi Structural Calcs 01: PDF Page 220 - Stability of Culvert Section page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	23.6 kN/m3 used through out	OK, waiting for updated calculations and drawings.
S-306	BRO	Topchi Structural Calcs 01: PDF Page 220 - Stability of Culvert Section page 1 of 2	Update Dead Load and Seismic Loads if unit weight of concrete changes.	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-307	BRO	Topchi Structural Calcs 01: PDF Page 220 - Stability of Culvert Section page 1 of 2	Coordinate dimensions with drawings. Total width of hollow chamber is shown to be 1.19 m and total width of culvert is shown to be 1.59 m. (See. Drawing SB-04 Section F-F)	D	Design Model based on center line so that forces are symmetrc whereas drawings show inner and outer dimensions.	OK, waiting for updated calculations and drawings.
S-308	BRO	Topchi Structural Calcs 01: PDF Page 232 - Rebar	The second line specifies 12mm bar spaced every 150mm. Appears to be input error. Please confirm.	A	yes, 200 mm mentioned in the updated calculation	OK, waiting for updated calculations and drawings.
S-309	BRO	Topchi Structural Calcs 01: PDF Page 335 - Stability of Culvert Section page 1 of 2	This section of the culvert is underground. Does the reinforcement design account for the soil and seismic forces at the greatest depth?	A	Yes, forces including seismic are taken at greatest soil depth	OK, waiting for updated calculations and drawings.

Response Legend
A - Agree
D - Disagree
O - Out of Scope
AE - Agree with exception

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
STRUCTURAL COMMENTS						
S-310	BRO	Topchi Structural Calcs 01: PDF Page 335 - Stability of Culvert Section page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-311	BRO	Topchi Structural Calcs 01: PDF Page 335 - Stability of Culvert Section page 1 of 2	Update Dead Load and Seismic Loads if unit weight of concrete changes.	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-312	BRO	Topchi Structural Calcs 01: PDF Page 349 - Rebar	The second line specifies 12mm bar spaced every 150mm. Appears to be input error. Please confirm.	A	yes, 200 mm mentioned in the updated calculation	OK, waiting for updated calculations and drawings.
Head Pond Hill side wall						OK, waiting for updated calculations and drawings.
S-401	BF	Topchi Structural Calcs 01-PDF Page 454 -Head pond Hill side Wall Cal. Page 1 of 2	Coordinate Angle of internal friction of soil with Geotechnical Report. In the report it is considered 20.1 degrees but the design assumed 30 degrees.	A	updated calculations include 20.1 degrees which is the geotech recommended internal angle of friction	OK, waiting for updated calculations and drawings.
S-402	BF	Topchi Structural Calcs 01-PDF Page 454 -Head pond Hill side Wall Cal. Page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-403	BF	Topchi Structural Calcs 01-PDF Page 454 -Head pond Hill side Wall Cal. Page 1 of 2	Coordinate the Height of Soil in Hillside (Hhg) with drawing. Drawing shows 4.05m but design uses 2.5m.	A	Drawing revised to show 2.5 m hillside soil height	OK, waiting for updated calculations and drawings.
S-404	BF	Topchi Structural Calcs 01-PDF Page 454 -Head pond Hill side Wall Cal. Page 1 of 2	Where do the values for "Dynamic loads" and "Uplift coefficient" come from? (0.25 and 0.75 respectively)	A	dynamic load factors arre adddtional loads on wall due to sediments and flowing water impacting it. In this cane this would be 0 as there are no sediments or flowing water imponding the wall. Uplift coefficient 0f 0.75 used since the structures rest on filter material incldluing geotextile and sand bed wich will reduce the uplift pressure.	OK, waiting for updated calculations and drawings.
S-405	BF	Topchi Structural Calcs 01-PDF Page 454 -Head pond Hill side Wall Cal. Page 1 of 2	Please update the calculation with showing units of loads.	A	Units included where missing in the updated calcualtions	OK, waiting for updated calculations and drawings.
S-406	BF	Topchi Structural Calcs 01-PDF Page 456 - Head Pond hill side wall STAAD Report. Page 1 of 11	Please Coordinate the Modulus of Elasticity of Concrete input to STAAD with the value Provided in general design narrative," 3.Details of Analysis and design" Topchi Structural Calcs 01-PDF Page 3.	A	Updated narrative and calcualtions use 21718456 kN/m2	OK, waiting for updated calculations and drawings.

Response Legend
A - Agree
D - Disagree
O - Out of Scope
AE - Agree with exception

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
STRUCTURAL COMMENTS						
S-407	BF	Topchi Structural Calcs 01-PDF Page 467 - Hill side wall of head pond Rebar Calculation Chart. Page 1 of 1	Please provide a detailed calculation with formulas which are used in the cells of this spread sheet.	D	Spreadsheet was sent earlier. We can send you the spreadsheet again to trace the formula used.	OK, waiting for updated calculations and drawings.
S-408	BF	Topchi Structural Calcs 01-PDF Page 467 - Hill side wall of head pond Rebar Calculation Chart. Page 1 of 1	Provided area of tensile rebar for Member 2 (Hill side slab) and Member 3 (wall) is less than required. Please provide steel greater or equal to required area.	AE	Steel area is based on strctural calculations for both compression and tension. It seems that tension bars were not labled clearly. This has now been updated.	OK, waiting for updated calculations and drawings.
S-409	BF	Topchi Structural Calcs 01-PDF, General	Please provide description or legend for Names and symbols used in your design analysis sheets.	AE	Most input parameters have legends and symbols, for the missing ones these have been added.	OK, waiting for updated calculations and drawings.
Head Pond River side wall						
S-410	BF	Topchi Structural Calcs 01-PDF Page 593 -Head pond River side Wall Cal. Page 1 of 2	Coordinate Angle of internal friction of soil with Geotechnical Report. In the report it is considered 20.1 degrees but the design assumed 30 degrees.	A	updated calculations include 20.1 degrees which is the geotech recommended internal angle of friction	OK, waiting for updated calculations and drawings.
S-411	BF	Topchi Structural Calcs 01-PDF Page 593 -Head pond River side Wall Cal. Page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-412	BF	Topchi Structural Calcs 01-PDF Page 593 -Head pond River side Wall Cal. Page 1 of 2	What is The surcharge load on hill side(w)?	A	Surcharge due to soil: 1.55 m on the riverside and 1.50 on the hillside	OK, waiting for updated calculations and drawings.
S-413	BF	Topchi Structural Calcs 01-PDF Page 593 -Head pond River side Wall Cal. Page 1 of 2	Where do the values for "Dynamic loads" and "Uplift coefficient" come from? (0.25 and 1.00 respectively)	A	dynamic load factors arre adddtional loads on wall due to sediments and flowing water impacting it. In this cane this would be 0 as there are no sediments or flowing water imponding the wall. Uplift coefficient 0f 0.75 used since the structures rest on filter material inclduing geotextile and sand bed wich will reduce the uplift pressure.	OK, waiting for updated calculations and drawings.
S-414	BF	Topchi Structural Calcs 01-PDF Page 593 -Head pond River side Wall Cal. Page 1 of 2	Please update the calculation with showing units of loads.	A	Units included where missing in the updated calcualtions	OK, waiting for updated calculations and drawings.
S-415	BF	Topchi Structural Calcs 01-PDF Page 593 -Head pond River side Wall Cal. Page 1 of 2	Please coordinate the Safe bearing capacity of soil with the Geotechnical Report, in calculation very large value is assumed.	A	98 kN/m2 used as per geotech report	OK, waiting for updated calculations and drawings.

Design Review
TOPCHI HYDROPOWER PLANT
drawings dated (Undated)
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D - Disagree
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STRUCTURAL COMMENTS						
S-416	BF	Topchi Structural Calcs 01-PDF Page 595 - Head Pond River side wall STAAD Report. Page 1 of 11	Please Coordinate the Modulus of Elasticity of Concrete input to STAAD with the value Provided in general design narrative," 3.Details of Analysis and design" Topchi Structural Calcs 01-PDF Page 3.	A	Updated narrative and calcualtions use 21718456 kN/m2	OK, waiting for updated calculations and drawings.
S-417	BF	Topchi Structural Calcs 01-PDF Page 606 - River side wall of head pond Rebar Calculation Chart. Page 1 of 1	Please provide a detailed calculation with formulas which are used in the cells of this spread sheet.	D	Spreadsheet was sent earlier. We can send you the spreadsheet again to trace the formula used.	OK, waiting for updated calculations and drawings.
S-418	BF	Topchi Structural Calcs 01-PDF Page 467 - Hill side wall of head pond Rebar Calculation Chart. Page 1 of 1	Provided area of tensile rebar for Member 2 (Hill side slab) and Member 3 (wall) is less than required. Please provide steel greater or equal to required area.	AE	Steel area is based on strctural calculations for both compression and tension. It seems that tension bars were not labled clearly. This has now been updated.	OK, waiting for updated calculations and drawings.
S-419	BF	Topchi Structural Calcs 01-PDF, General	Please provide description or legend for Names and symbols used in your design analysis sheets.	AE	Most input parameters have legends and symbols, for the missing ones these have been added.	OK, waiting for updated calculations and drawings.
Gravel Trap Culvert						
S-501	BRO	Topchi Structural Calcs 02: PDF Page 11 - Figure: Headrace Culvert Reinforcement Bars	This section must have bars going into the page. Add "Each Way" to reinforcement leaders and show reinforcement when detailing rebar.	A	Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-502	BRO	Topchi Structural Calcs 02: PDF Page 12 - Stability of Culvert Section page 1 of 2	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	23.6 kN/m3 used through out	OK, waiting for updated calculations and drawings.
S-503	BRO	Topchi Structural Calcs 02: PDF Page 12 - Stability of Culvert Section page 1 of 2	Update Dead Load and Seismic Loads if unit weight of concrete changes.	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-504	BRO	Topchi Structural Calcs 02: PDF Page 23 - Rebar	The second line specifies 25mm bar spaced every 150mm. Appears to be input error. Please confirm.	A	Should be 12 mm bars at 200 mm c/c. Updated in the revised calculations	OK, waiting for updated calculations and drawings.

Design Review
TOPCHI HYDROPOWER PLANT
drawings dated (Undated)
WO-LT-0034

Response Legend
A - Agree
D - Disagree
O - Out of Scope
AE - Agree with exception

Comment #	Reviewer	Reference	Comment	Response Code	Response	Back-Check
STRUCTURAL COMMENTS						
Settling Basin						
S-601	BRO	Topchi Structural Calcs 03: PDF Page 11 - Figure: Settling Basin section with rebars	This section must have bars going into the page. Add "Each Way" to reinforcement leaders and show reinforcement when detailing rebar.	A	Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-602	BRO	Topchi Structural Calcs 03: PDF Page 13 - STAAD Print Run 2 of 9	Coordinate the unit weight of concrete with page 2 of PDF in the "DETAILS OF ANALYSIS AND DESIGN".	A	23.6 kN/m3 used through out	OK, waiting for updated calculations and drawings.
S-603	BRO	Topchi Structural Calcs 03: PDF Page 13 - STAAD Print Run 2 of 9	Update Dead Load and Seismic Loads if unit weight of concrete changes.	A	updated in the revised calculation	OK, waiting for updated calculations and drawings.
S-604	BRO	Topchi Structural Calcs 03: PDF Page 22 - Rebar	The second line specifies 25mm bar spaced every 150mm. Appears to be input error. Please confirm.	A	Should be 12 mm bars at 200 mm c/c. Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-605	BRO	Topchi Structural Calcs 03: PDF Page 22 - Rebar	Member 3 (middle inclined slab) has a calculated area of reinforcement greater than the actual area. Provide greater actual area of reinforcement than calculated area.		Actual area of reinforcement is larger than the calculated area	OK, waiting for updated calculations and drawings.
Aqueduct 1						
S-701	BRO	Topchi Structural Calcs 04: PDF Page 12	Reinforcement for Aqueduct 2 has not been designed. Aqueduct 2 must be designed as a continuous span frame with the appropriate span lengths as shown in the original SAP model.	A	Updated calculations based on STAADPRO which includes reinforcement design as well	OK, waiting for updated calculations and drawings.
S-702	BRO	Topchi Structural Calcs 04: PDF Pages 22-31	These pages appear to be the same STAAD model as pages 13-21. Please confirm.	A	Revised	OK, waiting for updated calculations and drawings.
S-703	BRO	Topchi Structural Calcs 04: PDF Page 32	The moments used to design the steel do not inlcude the maximum moment from the STAAD model of 302.95 kN-m which occurs at 2 meters from the end.	A	Calculations updated	OK, waiting for updated calculations and drawings.
S-704	BRO	Topchi Structural Calcs 04: PDF Page 32	The spreadsheet shows a shear failure at the ends. Use the 20mm bar the entire length of the beam and not just in the middle as the the spreadsheet shows.	A	Calculations have been updated - 20 m bars used through out	OK, waiting for updated calculations and drawings.

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STRUCTURAL COMMENTS						
S-705	BRO	Topchi Structural Calcs 04: PDF Page 33	This page appears to be a copy of page 32 with a changed Structure name. Please confirm.	A	page 33 has been deleted	OK, waiting for updated calculations and drawings.
S-706	BRO	Topchi Structural Calcs 04: PDF Pages 68-77	These pages appear to be the same STAAD model as pages 58-67. Please confirm.	A	Repated pages have been deleted	OK, waiting for updated calculations and drawings.
S-707	BRO	Topchi Structural Calcs 04: PDF Page 78	The moments used to design the steel exceed the maximum moment from the STAAD model of 154.27 kN-m which occurs at 2 meters from the end.	D	Max moment is higher (290 kN - m) and reinforcement has been sized accordingly	OK, waiting for updated calculations and drawings.
S-708	BRO	Topchi Structural Calcs 04: PDF Page 78	The values for "h" and "d" reflect dimensions of the beam and not the slab.	D	Designs of beam and slab for moment purpose use same procedure, only for shear design these are taken as separate structures.	OK, waiting for updated calculations and drawings.
S-709	BRO	Topchi Structural Calcs 04: General on Slab Design	Transverse reinforcement needs to be designed for the slab to resist the moment caused by canal overhanging the edge of the beam.	A	updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-710	BRO	Topchi Structural Calcs 04: PDF Page 112	The second line specifies 12mm bar spaced every 150mm. Appears to be input error. Please confirm.	A	updated as 12 mm bars at 200 mm spacing c/c	OK, waiting for updated calculations and drawings.
Aqueduct 2						
S-801	BRO	Topchi Structural Calcs 05: PDF Page 12 - Cross Section of main beam	Design for main beam has 4 Nos 16mm bars on top and 4 Nos 20mm on bottom. Change "Cross section of main beam" to reflect design.	D	Bar sizes change depending the location. This will be clear once the entire reinforcement drawings are provided. We are working on these.	OK, waiting for updated calculations and drawings.
S-802	BRO	Topchi Structural Calcs 05: PDF Page 13 - Beams	Beams 27 and 29 connect the same two nodes. Delete Beam 29 and apply loads to Beam 27.	D	In STAADPro two beam types are provided - one for analysis (which can contain multiple number of nodes for geometrical purpose and to accommodate the change in laoding conditions); another for modelling the actual physical memebrs. Note that connecting to the same node does not affect analysis and desgin results - it is done for the convenient for analysis purpose	OK, waiting for updated calculations and drawings.
S-803	BRO	Topchi Structural Calcs 05: PDF Page 14 - STAAD Model	The four columns should be assumed to be "fixed" at the bottom and not "pinned" as shown.	AE	We assumed pinned as the footing will not be anchored on rock + the columns span in one direction only (i.e., ifwe had columns spanning lenghts and widths then we could have assumed fixed bottom). With pin joints rotation on soil can also be accounted for.	OK, waiting for updated calculations and drawings.

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STRUCTURAL COMMENTS						
S-804	BRO	Topchi Structural Calcs 05: PDF Page 14 - Materials	Coordinate the properties of concrete with the properties stated in "DETAILS OF ANALYSIS AND DESIGN" on PDF Pages 2 and 3.	A	This has been updated in STAADPro.	OK, waiting for updated calculations and drawings.
S-805	BRO	Topchi Structural Calcs 05: PDF Page 15 - Combination Load Cases	Load Case 2 in Load Combinations 9 and 10 should have a factor of 1.40 (not 1.6) since it is a dead load.	A	Updated	OK, waiting for updated calculations and drawings.
S-806	BRO	Topchi Structural Calcs 05: PDF Page 23 - Cross Beam	Factored Moment, M seems very conservative. How was this value obtained. Maximum moment from STAAD was around 246 kN-m.	A	246 KN-m is the correct max moment. This was because the output form the new run was not updated. This has been now updated	OK, waiting for updated calculations and drawings.
S-807	BRO	Topchi Structural Calcs 05: PDF Page 23 - Cross Beam	Should not include the 2 Nos 12mm in the "Area Provided" since they do not have the same "d" value. The 4 Nos 20mm should be enough though if the the Factored Moment is reduced.	A	This was because the output form the new run was not updated. This has been now updated	OK, waiting for updated calculations and drawings.
S-808	BRO	Topchi Structural Calcs 05: PDF Page 24 - Column Design	This page states that the supports are fixed. The STAAD model assumes the columns are "pinned" at the bottom. The STAAD model must be modified to have the columns "fixed" at the bottom. This will result in greater moments which may change the column design.	AE	Fixed support was an error which has been rectified. Analysis based on "pinned at the bottom" for reasons stated in S803 response.	OK, waiting for updated calculations and drawings.
S-809	BRO	Topchi Structural Calcs 05: PDF Page 25 - Footing Design	The 880 kN should not be factored and treated like a live load. It's combined loads have already been factored so it should just be treated as an additional reaction.	A	Updated	OK, waiting for updated calculations and drawings.
S-810	BRO	Topchi Structural Calcs 05: PDF Page 25 - Footing Design	(Step 2. Earth Pressure) F = 1.5Gk + 1.6Qk does not equal 1408.00 kN	A	Updated	OK, waiting for updated calculations and drawings.
S-811	BRO	Topchi Structural Calcs 05: PDF Page 25 - Footing Design	(Step 4. Bending Reinforcement) The moment from the bottom of the column must also be accounted for. This moment will be calculated in STAAD when the bottom of the column is considered to be "fixed".	AE	Pinned joint at bottom assumed to acount for potential rotation as the footings are not achnored in rock - response S803	OK, waiting for updated calculations and drawings.
S-812	BRO	Topchi Structural Calcs 05: General	Provide slab design. Slab must be designed to span across beams in transverse direction.	A	Sheet was missing earlier. This has now been included	OK, waiting for updated calculations and drawings.
S-813	BRO	Topchi Structural Calcs 05: General	Provide wall design. Walls must be designed as cantilevers	A	Sheet was missing earlier. This has now been included	OK, waiting for updated calculations and drawings.

Design Review
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STRUCTURAL COMMENTS						
Powerhouse Building						
S-901	BRO	Topchi Structural Calcs 06A: PDF Page 13 - Load and other parameter of powerhouse	Snow Load and Roof Live Load should be calculated and included in design.	A	These have been taken into account in the updated calculations. 1.5 kN/m2 live load and 6 kN/m2 (approx 3 ft) snow load have been accounted for in the update.	OK, waiting for updated calculations and drawings.
S-902	BRO	Topchi Structural Calcs 06A: PDF Page 15 - Combination Load Cases	Load Case 2 in Load Combination 8 should have a factor of 1.60 (not 1.40) since it is a live load. Load Case 11 in Load Combination 8 should have a factor of 1.40 (not 1.60) since it is a dead load.	A	Noted and updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-903	BRO	Topchi Structural Calcs 06A: PDF Page 36 - Basic Load Cases	The Truss and Roof Load should be applied half way between the columns as well as at the columns since there are 11 trusses and not just 6.	A	Noted and updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-904	BRO	Topchi Structural Calcs 06A: PDF Page 132 - Column Main Reinforcement	Columns require reinforcement design.	AE	Reinforcement design has been undertaken in STAADPro. See updated powerhouse file which has typical reinforcement drawing. Final reinforcement drawings for each footing will be submitted once we have concurrence on structural calculations	OK, waiting for updated calculations and drawings.
S-905	BRO	Topchi Structural Calcs 06A: General - All Isolated Footing Designs	Design Footing Clear Cover is 50 mm but the Design Narrative states Footing Clear Cover is 75 mm. Please coordinate.	A	Cover should be 75 mm. This has been updated in the revised calculations.	OK, waiting for updated calculations and drawings.
S-906	BRO	Topchi Structural Calcs 06A: General - All Isolated Footing Designs	Design Soil Unit Weight is 14 kN/m^3 but the Design Narrative states Soil Unit Weight is 18 kN/m^3. Please Coordinate	A	18 kN/m3 used in the updated calculations	OK, waiting for updated calculations and drawings.
S-907	BRO	Topchi Structural Calcs 06A: General - All Isolated Footing Designs	What is the final thickness for each footing. Footings show a calculated effective depth (in "Check For Trial Depth against moment about X/Z Axis") that is greater than the initial footing thickness.	AE	Final thickness and other dimensions for each footing (and for other members) have been determined from structural calculations and can be seen in the updated powerhouse STAADPro file . Moment in both directions have been checked.	OK, waiting for updated calculations and drawings.
S-908	BRO	Topchi Structural Calcs 06A: General - Truss	Members and connections of Roof Trusses need to be designed.	A	These will be sent as a separate STAADPro file.	OK, waiting for updated calculations and drawings.

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STRUCTURAL COMMENTS						
Two Family Quarter Building						
S-1001	BF	Topchi Structural Cals 07: PDF page 13 Load and other parameter of powerhouse	Snow Load and Roof Live Load should be calculated and included in design.	A	These have been taken into account in the updated calculations. 1.5 kN/m2 live load and 6 kN/m2 (approx 3 ft) snow load have been accounted for in the update.	OK, waiting for updated calculations and drawings.
S-1002	BF	Topchi Structural Cals 07: PDF page 14 STAAD INPUT FILE	In loads 1,2,3 & 4 the load Type on Structural component is assumed Live instead of Dead. Please call them dead.	A	Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-1003	BF	Topchi Structural Cals 07: PDF page 18 Combination Load Cases	Load Cases 1, 2 and 3 in Load Combination 7 should have a factor of 1.40 (not 1.60) since they are dead loads.	A	Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-1004	BF	Topchi Structural Calcs 07: General - All Isolated Footing Designs	Design Footing Clear Cover is 50 mm but the Design Narrative states Footing Clear Cover is 75 mm. Please coordinate.	A	Clear cover is 75 mm. Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-1005	BF	Topchi Structural Calcs 07: General - All Isolated Footing Designs	Design Soil Unit Weight is 14 kN/m^3 but the Design Narrative states Soil Unit Weight is 18 kN/m^3. Please Coordinate	A	Soil unit wieght is 18 kN/m3Updated in the revised calculations	OK, waiting for updated calculations and drawings.
S-1006	BF	Topchi Structural Calcs 07: General - All Isolated Footing Designs	What is the final thickness for each footing. Footings show a calculated effective depth (in "Check For Trial Depth against moment about X/Z Axis") that is greater than the initial footing thickness.	AE	Final thickness and other dimensions for each footing (and for other members) have been determined from structural calculations and can be seen in the updated powerhouse STAADPro file . Moment in both directions have been checked.	OK, waiting for updated calculations and drawings.

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STRUCTURAL COMMENTS						
Intake Flood Wall						
S-1101	BRO	Topchi Structural Calcs 08: PDF Page 12 - Soil Properties	Is the 150 kN/m^2 Safe Bearing Capacity of the Soil supported by the Geotech Report? Could you specify the location in the Geotech Report where this bearing capacity is addressed?	AE	Since the soil according to the test pit TP1 is "GM" as per USCS classification (45% gravel, 39% sand and only 16% silt and clay) 150 kN/m2 of bearing pressure is expected. TP1 test pit is at the river bank and the Coordinates are E12401028.44 N3854402.90 and Elevation =2397.79. According to the soil type even when fine sand, silt (dry lumps easily pulverzed by the fingers) is assuemd the safe bearing pressure will be 150 kN/m2. See bearing capcity table based on BS code attached as a separate document. For all structures away from the river bed and banks, an allowable bearing pressure of 98 kN/m2 has been used. According to the soil type 150 kN/m2 of safe bearing pressure is applicable and this value has been used for the floodwalls which also keeps the footings at reasonable sizes and hence corresponding costs can also be controlled.	TP1 is relatively close to the river bank, but the Geotechnical Report states that TP1 hit concrete at a depth of 1 meter and only obtained data for 1 meter deep. To calculate an accurate bearing capacity for a footing, a test pit is needed with a depth greater than 1 meter. Also, the Geotechnical Report provides a maximum allowable bearing capacity of 0.98 kg/cm^2 (96.1 kN/m^2). This value should be used for structural design. See attached excerpts from the Geotechnical Report.
S-1102	BRO	Topchi Structural Calcs 08: PDF Page 12 - Result	Does the maximum bearing capacity of 146.10 kN/m^2 include a safety factor of 1.5?		According to IS and BS code, factor of safety is not applied in bearing capacity calcualtions, i.e., the allowable bearing capcity already has in-built safety factor	OK, waiting for updated calculations and drawings.
S-1103	BRO	Topchi Structural Calcs 08: PDF Page 25 - Member 2	Maximum Inner moment requires more reinforcement than 16mm bars spaced at 200mm.	D	Max inner moment is 540.03 kNm for this member and reinforcement has been designed accordingly.. There are 16 mm bars at 200 mm and 12 mm bars at 200 mm bundled together (in page 11 cross sectional drawing)	OK, waiting for updated calculations and drawings.
S-1104	BRO	Topchi Structural Calcs 08: PDF Page 25 - Member 2	Maximum Outer moment is 393.25 kN-m (not 362.38 kN-m)	D	Max outer moment is 362.38 kN m for this member and reinforcement has been designed accordingly. Not sure where 393.25 kN-m came from?	OK, waiting for updated calculations and drawings.
S-1105	BRO	Topchi Structural Calcs 08: PDF Page 25 - Member 2	Maximum Outer moment requires 16mm bars spaced at 200mm (diagram on PDF Page 11 shows 12mm bars spaced at 200mm)	D	16 mm vertical bar from the stem is bent at the bottom slab and extends 1 m from the face of the stem. This bar has also been taken into account in the moment resistance calculations. These will be clearly shown in the reinforcement drawings and bar beding schedule.	OK, waiting for updated calculations and drawings.